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Pacific Marine Review

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SEATTLE'S ANSWER
TO THE CALL
FOR SHIPS

A Hundred Million People with One Idea



From the painting in the Metropolitan Museum of Art

You remember that wonderful picture of Joan of Arc by Bastien Lepage? Do you remember the eyes that look out of the picture with a fixed gaze, unmindful of everything except the object of her heart's desire, to save France?

It has its lesson for us today.

We, too, must look into the future with unfaltering gaze—unmindful of everything except our one great object.

One hundred million Americans must fix their eyes on one goal.

It is not given to all to serve alike, but each can buy more Liberty Bonds, and still more; more War Savings Stamps, and still more—use less wheat, eat less meat, and spend as little as possible for personal needs

—for thrift and saving will help win the war.

Thus shall we attain to that oneness of mind and purpose which is an irresistible force—against which mere selfishness struggles but vainly.

¶ We are proud of the vast economies in time, labor and money which the use of Linde oxygen has made possible in the prosecution of the war.

¶ *Collier's* for March 2nd published a double-page illustration with the title, "An Impossible Plan that Worked."

¶ It showed how oxy-acetylene apparatus was used to cut the Lake steamships apart so they could be brought through the canal locks, and weld them together again when they reached the seaboard.

LINDE AIR PRODUCTS COMPANY
(PACIFIC COAST)

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EMERYVILLE
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15th and Hoyt Streets

SEATTLE
530 First Avenue South

PACIFIC MARINE REVIEW

July, 1918

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Seattle, the "Queen City"

WHEN the urgent appeal for more ships was sounded throughout the country, there were but few localities which were in a position to respond. We were not a shipbuilding nation. Our prowess as exponents of the best in the art of maritime construction had dwindled as our nation deserted the sea. There had always remained a nucleus, however, and while the big steel shipbuilding plants of the country could be counted upon one's fingers, these yards turned out the highest class of workmanship.

In the expansion of the shipbuilding industry and the subsequent remarkable record of production, the Puget Sound district has taken a truly wonderful part. It is with justifiable pride that Seattle points to her shipbuilding achievement and to the records that have been hung up around her by neighboring communities. Five splendidly equipped steel shipbuilding establishments are now launching vessels into the waters of Puget Sound, while still other plants will soon send the first products of their handiwork down the ways. Nor are the wooden shipbuilders behind their steel working brethren in energy, foresight and determination to strain every nerve towards record production.

Important as the expansion of steel and wooden shipbuilding activities has proven, these industries form but one phase of Seattle's remarkable commercial and industrial advancement of the past few years. With an energy that has perhaps not been equalled by any other Pacific Coast community, Seattle has reached out after her foreign trade opportunities, and of late years has shown records of imports and exports that have proven a series of surprises to the entire country.

Such records are too often ascribed to natural conditions. It is true that the City of Seattle is favored by the existence of a selection of transcontinental rail arteries, that she possesses a truly strategical position relative to the most favorable ocean trade routes to the Orient, and that she is the center for a region with a rapidly developing purchasing power, but all of these conditions combined are not sufficient in themselves to produce results. Even her undisputed title, the gateway to Alaska, would not in itself have much effect upon her commercial life.

Seattle has achieved her own greatness. It has not been thrust upon her or presented as a gift of the gods, but it has been planned for, fought for and fairly won. Her merchants have accepted grave risks and gone far afield in the realms of foreign trade, her steamship companies have maintained the necessary sea connections to contribute to her greatness and her dock authorities have left nothing undone in the way of terminal facilities. Seattle has been busily co-ordinating the elements that make for success, her people have stood solidly back of those in the forefront of commercial advancement and the result has been an achievement of which not only Seattle, but the entire Pacific Coast may well feel proud.

On the following pages will be found just some brief mention of a few of those firms which are helping to make Seattle such a remarkable shipbuilding center. It is hard to realize that only a few short years ago there was but one steel shipyard in the entire Northwest, and that yard, while splendidly equipped, received but a portion of the work necessary to keep it fully occupied. Seattle did not wait, however, for opportunity to knock more than once, but swung open her hospitable doors and welcomed the shipbuilder, both in steel and wood, as she had already welcomed foreign trade, determined that nothing should be left undone to make the Puget Sound country a great industrial region surrounding the beautiful expanse of water which she had already dedicated to foreign trade.

Seattle's remarkable growth has been a revelation, let us hope that it will also prove an inspiration and an object lesson to all our Coast cities, and that they may all learn the use of her talisman, —the community spirit that abides among her people.

Future Development of Harbor and Rail Facilities for Seattle

By G. F. Nicholson, Chief Engineer, Port of Seattle



SEVERAL general principles have been formulated for the development of a first class seaport, such as deep and ample channels to the sea, and accessibility to an extensive agricultural and industrial territory. Equally important is the proper location of the harbor lines, the establishment of public waterways, a wide waterfront marg-

inal street paralleling the waterfront and a terminal railway. These principles should be of first consideration, as they form the foundation upon which is developed an efficient terminal and industrial system.

A port terminal, to the average person, means wharves and docks. As a matter of fact, a wharf or pier is more or less a detail in a general terminal scheme. The complete port terminal system is a combination of wharves, transit sheds, warehouses, railway tracks, marginal streets, and all the facilities that have to do with the transfer of commodities between land and water carriers. Each one of the facilities mentioned is a detail unit which, to be fully efficient, must be co-ordinated with other units so as to make of the whole a well-balanced terminal system. The articulation of the waterfront with railroads, warehouses, and industrial sites, is of particular importance.

The modern port terminal should comprise not merely a group of well designed and equipped wharves, but it should have good waterside warehouse provisions, as close to the transit shed as possible, to decrease the distance of trucking the cargo for storage. The space between the transit shed and warehouse should be taken up with only sufficient trackage to accommodate both facilities. The most important requirement of this layout, and which should be emphasized, is that the long dimension of the warehouse should parallel the long dimension of the transit shed. These warehouses will take care of the overflow cargo held pending the arrival of ships, or be used for storage on account of delayed delivery through the tributary country. In this group of warehouses should be found cold storage facilities in order to retain the perishable commodities until ready for market. Sufficient streets of access to and from the piers

should be constructed with good grades for vehicular traffic in distributing freight locally, and also land areas provided for the future location of industrial establishments nearby the warehouse and terminals, from the piers of which they could expect to import their raw materials, and in turn export their surplus output of manufactured goods at a minimum rehandling cost. It is a well known fact that a general terminal plan without adequate railroad facilities for receiving and handling freight is useless. The intimate physical relation between the railroads and the waterfront, and its facilities for the prompt interchange of freight between the piers and all the railroads entering the city practically means a terminal railway or belt line.

Economical freight handling equipment is one of the most essential requirements of the modern port, and the necessity for more efficient methods of handling freight at marine terminals is increasing daily, and is due, in a large measure, to the passing of cheap labor and the increasing proportion of time lost in terminals, as compared with the time consumed between terminals. To offset rising costs, not only the cost of handling must be reduced, but more freight must be handled in a given space than ever before in order to reduce the liability of congestion resulting from the increased amount to be handled. As the terminal acts as a sort of elastic reservoir between carriers, its area must be utilized to as large an extent as possible in order to reduce the terminal charges by reducing the overhead, and to reduce the time element so as to keep the ratio of time during which the carrier is at the terminal to the time consumed between terminals as low as possible, thus increasing the returns on the carrier itself.

Comprehensive Development of the Seattle Harbor

Nature has endowed Seattle with a deep harbor and channels, and with the necessary dredging from time to time will be able to provide more waterfront as she needs it. Five transcontinental railroad lines and its branches connect the harbor with rich agricultural lands and busy industrial centers. The harbor lines, along the waterfront, with a few exceptions, have been well located, and numerous public waterways and street ends have been established, giving the public access from the waterside; also a wide marginal street parallels the waterfront. However, the two features that are most notably lacking are, first, a comprehensive plan of development of adequate terminal facilities, as is

WASSEL OROVATO

seen from the few modern wharves and warehouses scattered on the main waterfront; second, a terminal railway operated under one management.

Although the Port Commission has fought hard to remedy these evils, the first step taken by the commercial organizations of the city was the appointing of a Terminal Survey Commission by the Seattle Chamber of Commerce. The Honorable Richard A. Ballinger is chairman of this Commission and a very thorough and complete report has been submitted. At the outset the Port Commission were called upon for suggestions as to the most efficient development for the future needs of the Seattle harbor.

In order to obtain the maximum of terminal efficiency a comprehensive plan should be prepared, approved, and followed, and the carrying out of such a plan in its fundamentals would insure the various sections of the waterfront to be utilized to the best advantage for the purpose to which they are best suited. In considering the future development of any port, two fundamental facts can be learned with the experience of port development in the past.

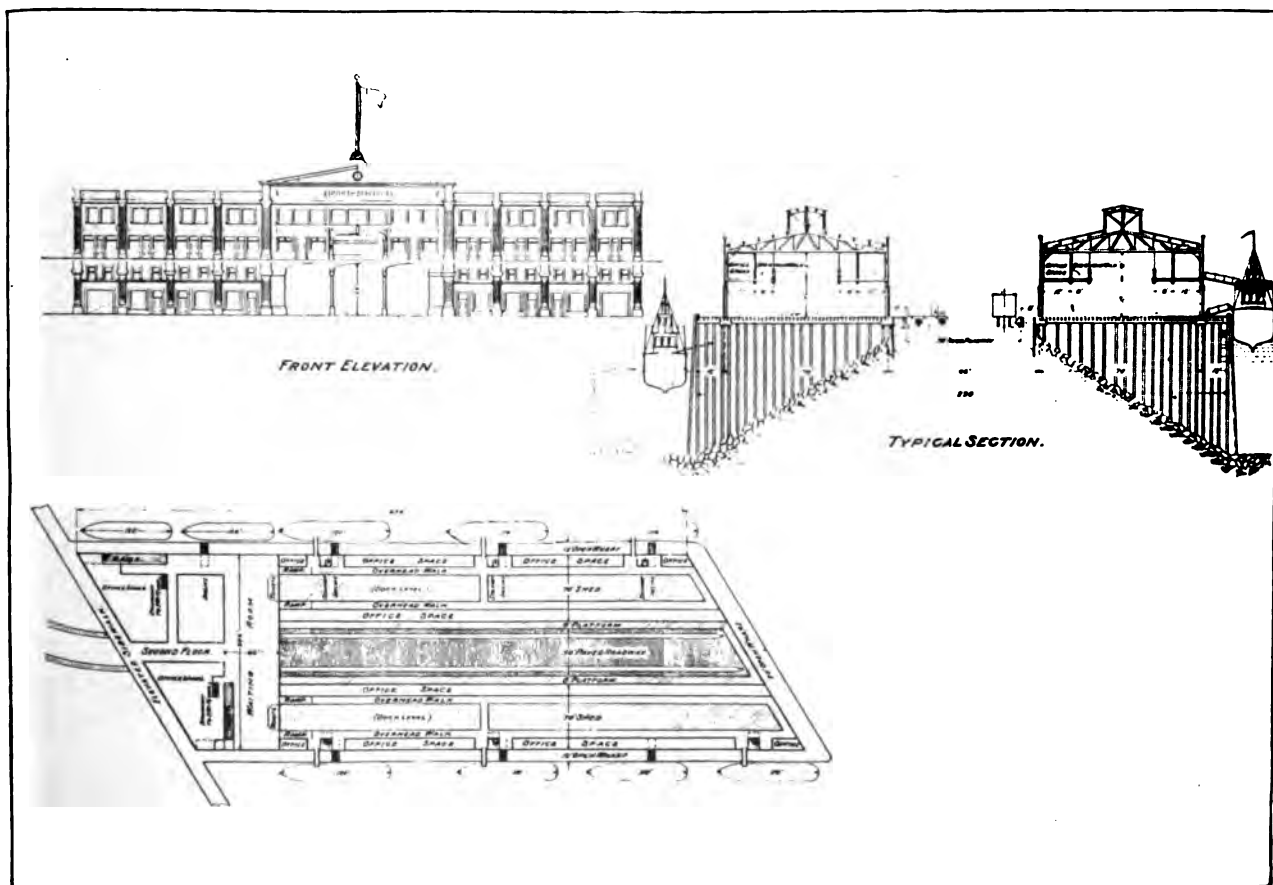
1. The lack of planning ahead has nearly always proven to be very detrimental to the growth of port cities and to the well-being, and especially to the pocketbooks, of the city inhabitants.

2. Since the needs and ideals of modern port development differs fundamentally from the ideals of past centuries, even the best plans made for

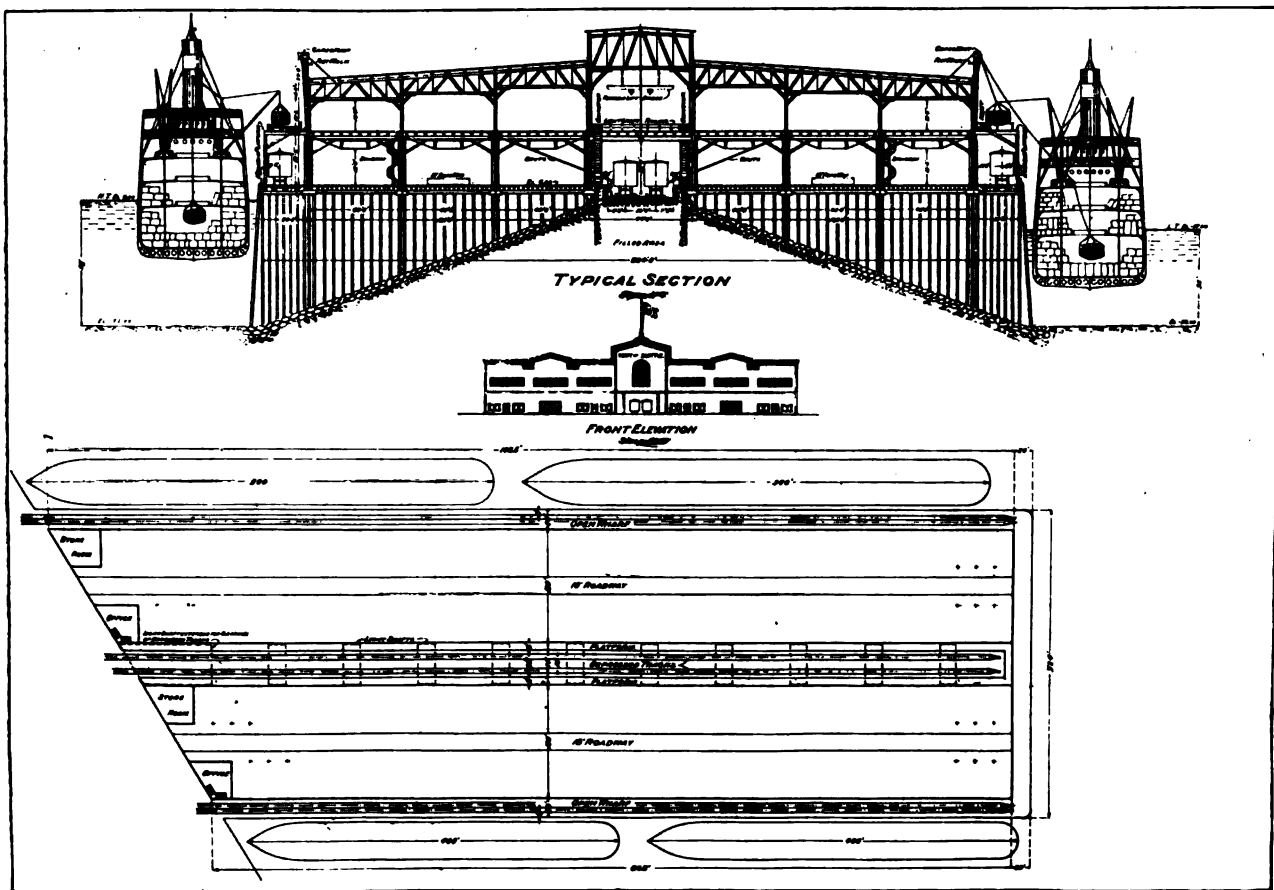
great cities in the past can be adapted to the growth of modern cities only after very material changes to fit local conditions.

Improvements along certain definite lines is most desirable. Where large amounts of given kinds of freight are handled, the wharves and docks can be profitably specialized. Overseas commerce should be handled in the outlying districts, namely, the Smith's Cove territory and the South City district on either side of the East and West Waterways, including Harbor Island, thus relieving the central waterfront from congestion.

Between Yesler Way and Broad Street, this section of the central waterfront should be reserved for what we might term local freight and passenger traffic, such as coastwise and Alaskan trade, together with the small local boats plying on the Sound. Through freight should not be handled along the central waterfront, as is the case now. Since a large percentage of the local freight that comes into the harbor is transferred in motor trucks or horse-drawn vehicles, the location of these local docks should be near the business section. Railroad facilities should be provided for convenience, however, to take care of the small percentage that goes out by car, but the fact that this district is reserved for the local freight docks would relieve congestion of railroad traffic along the marginal way. A public terminal station is also suggested at the foot of Union Street to accommodate the ferry and Sound boat passenger and freight traffic.



Proposed plan for coastwise and local passenger and freight traffic wharf.



Proposed wharf and transit shed plan adapted to overseas traffic.

The district between Broad Street and the Smith's Cove Waterway should be reserved for piers to take care of the overseas business and through freight, and the warehouses should be excluded. The addition of warehouses on this section of the waterfront would only add to congestion of the marginal way.

South of Yesler Way, as far as Spokane Street, this east shore of the East Waterway should be reserved for piers, backed by six-story warehouses, and the slip system should have preference over the quay wharf plan. There seems to be an idea that the main waterfront, especially south of Yesler Way, should be developed along the quay wharf plan. It would be a serious mistake to adopt the quay system on any part of the mainland waterfront between Spokane Street and Smith's Cove.

Notwithstanding the general opinion, to the contrary, Seattle's waterfront will be limited in a few years for overseas commerce. It is only by including Lake Washington, Lake Union and narrow strips of shore line under the many bluffs, that we approach the extent of a commercial waterfront of many large cities.

The strip of waterfront along the east side which has a large warehouse and industrial area to the rear of it, should be made the most use of. Pier development gives four times the berthage on this high priced frontage that quay wharves would. Besides the increased berthage and transit shed

space, better access can be had to the different terminals by trucks and railroad traffic. The depressed tracks along the quay wharf would interfere materially with team traffic or motor trucks operating between the main thoroughfare and the wharves and warehouses. In other words, the quay system requires street ends for railway and team access. Street ends tend to be wasted, while the slip street end is more valuable than the land street end. The quay system also necessitates berthing ships in a channel under conditions effected by tidal currents, and in the above case also river currents; then too, lighters alongside ships would tend to congest the fair way. No modern engineer advocates the quay system where it is possible to develop piers. A survey of the plans of the great river ports of the world show that in later years dock basins have been dredged alongside the river to expand the port's facilities, and in these dock basins the pier system has been uniformly adopted; also along the riverfronts slips have been dredged and the pier system adopted. The advantages of the slip system are so evident that there should be no question about the adoption of this scheme along the main east front of the East Waterway.

The quay wharf system should be adopted on the east and west side of Harbor Island; also on the west side of the West Waterway on the main land. The pier system should prevail on the north end of Harbor Island and the main land to the west of

West Waterway. Harbor Island affords a fine opportunity for industrial development to the rear of the quay wharves and warehouses alongside the waterways. Waterside warehouses should be one of the first considerations in future development planning, and we should profit by the mistake made by other ports in the adoption of the head house plan, where freight has to be trucked the full length of the transit shed to reach the warehouse.

The trackage on Railroad Avenue, the marginal street back of the terminal facilities, should be rearranged and some eliminated, in order to obtain a through street from end to end, upon which the vehicular traffic will not be obstructed by switching. That property east of the east line of the marginal way can be utilized for warehouse and industrial purposes as far as the street line.

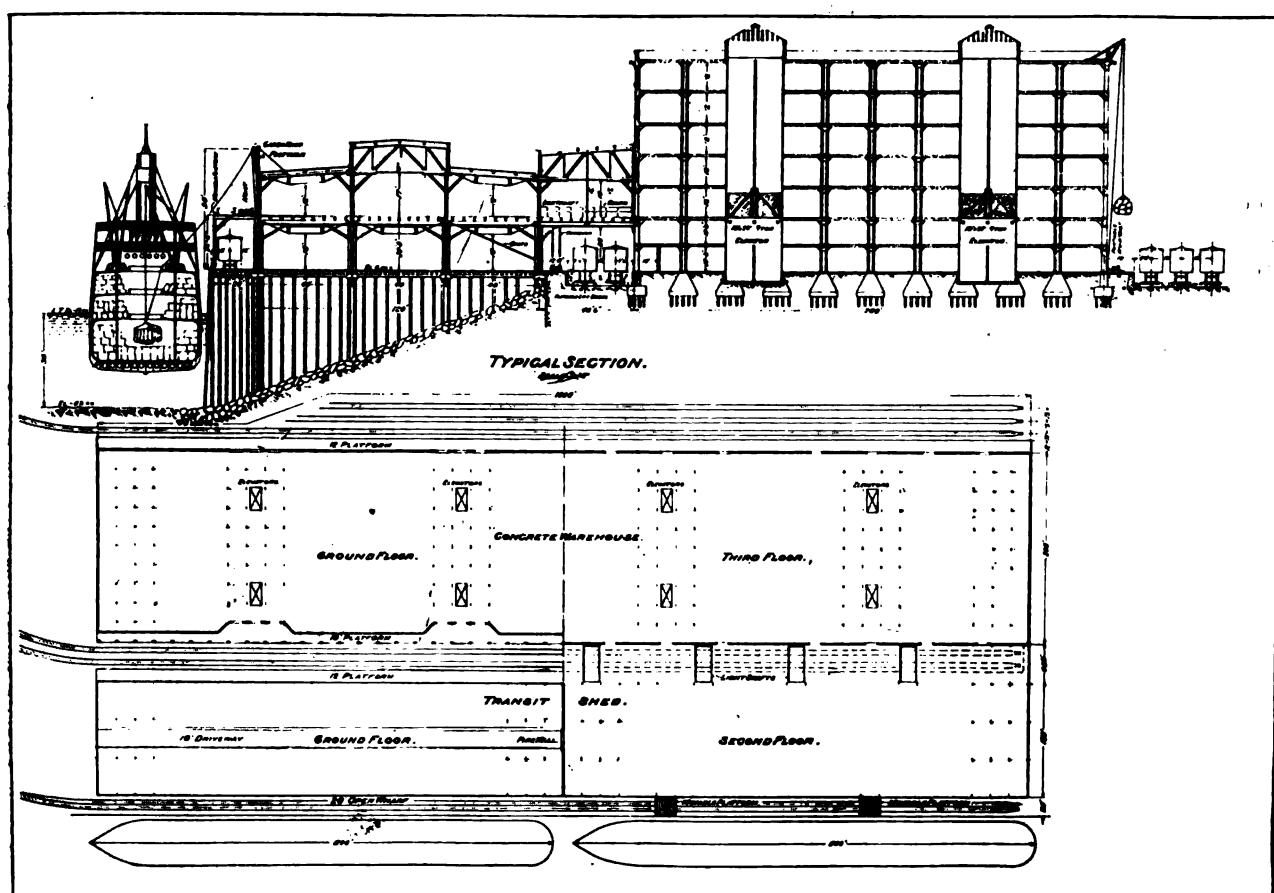
A coaling station should also be provided in the general scheme, preferably in the south end of the bay, in order to relieve congestion along the main waterfront. The point where the mainland west of the West Waterway forms an abrupt angle with the West Seattle district would be a good location, since it is well protected by Duwamish head from the sweep of winds across the bay, and the track facilities in connection with coaling station would run on the west side of the Duwamish waterway and cross well to the south in order to avoid any congestion on the east side of the Duwamish. The latter should be the primary

reason for the location of coal dock as suggested. This pier should accommodate four vessels and several barges at the same time, and be equipped with the latest mechanical devices to reduce the cost of handling to a minimum.

Street ends are not taken into consideration in the planning of the future development, because there is no connection between the street end and the terminal facilities beyond the bulkhead.

Modern Piers and Wharves

The development of modern marine transportation has necessitated the corresponding development of marine terminals. This has meant piers and pier sheds of greatly increased size, heavier construction, fire resisting qualities, and equipped with extensive freight handling equipment. Since there is a tendency for ships to increase their freight carrying capacity by adding to their length and beam, the effect is to require wider piers and sheds of greater capacity than have been constructed in the past. Although the Port Commission sheds are even wider than the majority of the privately owned piers along the waterfront, we consider that the 90 or 100 feet is not sufficient width, and that 120 feet would be the proper width for such a shed. Since an 8800-ton vessel requires approximately 60,000 square feet of floor space, a 120-foot shed would accommodate such a vessel to good advantage. A shed wider than this would cause an increase in the cost of handling, due to the fact



Proposed plan for quay wharf connected up with warehouse facilities.



The Stacy Street concrete warehouse, a fine structure fitted with handling machinery.

that cargo would have to be trucked a greater distance than necessary. Assuming that the length and physical construction of the quay wharf is fixed by the length of the vessel it is to berth, a pier should have double its capacity, since a pier may be considered as two quays placed back to back, and can take care of double the number of ships. Heretofore, it has been the custom to construct a pier wharf the same size as a quay wharf, when, as has been pointed out, it should be twice the size.

Two-Story Transit Sheds

The Port Commission in the construction of its latest transit sheds has adopted the two-story plan, and this type of construction should most certainly be carried out in the future. As valuable a piece of waterfront as the wharf and transit shed is constructed upon, it should be recognized that this area should be put to fullest use possible. The additional cost for providing heavier foundations to carry a second floor is comparatively small compared with the additional space gained. If a mechanical freight handling equipment would permit a third floor to be as adaptable for the transfer and short time storage of transient freight, then it would be advisable to make such an addition. At present the Port Commission is adding mechanical equipment in order to place the second floor on a par with the first floor, and, in fact, with the aid of gravity wooden or steel chutes, loading out can be done cheaper from the second floor to car or ship than from the first floor. The two rows of posts necessary to support the second floor are not an objectionable feature at all. They do not interfere with trucking, and

head mechanical freight handling device, thus decreasing, instead of increasing, the capacity of shed room to meet the demands of present day modern freighters. From experience, we should realize that it is only possible to load a very small percentage of a ship's cargo direct from ship to car, even with the best of track facilities. The cargo has to be sorted, and there is a limit to trackage alongside shed, so that adequate space is needed to take care of this transit freight.

Why Timber Docks and Concrete Warehouses are Preferable

The trend of modern port construction is to the wooden type of dock and concrete warehouse. Before a port terminal is improved, there is always an agitation for concrete docks, especially when funds have been voted for improvements by a municipality, the public generally making a strong plea, and many engineers contending that it should be used, thereby making a more substantial and permanent structure. But even so, wooden docks are still being constructed, and even those ports which have built the expensive concrete type, have in many cases changed their construction to wood, recognizing the value of the latter. Port engineers



Bell Street terminal, showing cargo shed and fireproof warehouse in foreground.

the electric tractors with their fourwheel drive and steer make the sharp turns with ease. A very grave mistake has been made in some of the large ports, especially those with a limited waterfront, in the adoption of the one-story shed idea. In the past year a noted Eastern terminal engineer designed and constructed a terminal with a high ceiling one-story transit shed, 60 feet in width, in order to accommodate an over-

have been sent on extensive trips to ascertain the best type of construction, and generally come back strongly convinced that wooden docks are the best, and recommend such. In Seattle, a thorough investigation was made before building the Port Commission terminals, and timber wharves on creosoted pile foundations, carrying freight sheds of timber frame with board walls covered with corrugated iron, and wooden roofs covered with tar and gravel or other fire retarding roofing, were decided upon. A good argument in favor of the cheaper creosoted pile and timber construction is that in case of fire the loss to such a dock would not be so great, and there would be some salvage, while in a concrete structure there would be scarcely any, and the cost of wrecking the latter would be expensive. There is no doubt that there are advantages in the concrete structure, which we should all recognize. The insurance rate on a concrete structure, is, of course, lower, and I am informed by the State Insurance Rating Bureau it is approximately one-half of the rate on a timber wharf. The maintenance cost of a concrete structure is also lower than of a timber building, and in the Middle West and Eastern territory, they are compelled to pay more for lumber, probably three times as much in some inland cities, so that the difference in cost between the timber and concrete structure is much less. Again, in some tropical ports, such as Honolulu, the marine borer is much more prevalent than here, and even creosoted piles are very short lived. However, the advantages of the timber wharf in Seattle should overrule the advantages of the more permanent structure. Wharves and transit sheds, as have been built by the Port Commission, will have a life of probably twenty-five or thirty years, which is about the economically useful life of such a structure, while in that length of time a concrete dock may become antiquated, since conditions of water transportation and mechanical freight handling equipment for the quick dispatch of cargo are constantly changing. Then again, at some time in the future, when labor costs rise to such a level that the shipper will make a radical change from the present day methods, ships will be loaded in a systematic manner,—in fact, loaded the same way as they are unloaded,—so that instead of several markings in one sling, there will be only one marking. A one-package continuous conveyor may be employed for cargoes of the same commodity, or even the handling of some mixed freight. There are new mechanical appliances being experimented with every day in order to decrease the handling cost. In time, it may be only five years, some very efficient handling device may be perfected to take care of mixed freight. It may be that this new handling device could not be installed in a concrete structure, making same obsolete, whereas in the timber structure necessary changes might be made to take care of same, or on account of the saving

in labor, it might even pay to dismantle the structure and erect one suitable to the mechanical handling device. Too much emphasis cannot be put on this argument for timber docks. There are several European concrete docks which are not now in use on account of them not being adaptable for improved mechanical handling equipment. The creosoted foundation piles of the timber dock can always be replaced or changed at any time, as well as any other part of the dock, at a nominal expense. In the Northwest, on the Pacific Coast, a timber structure will cost approximately one-third that of a concrete structure. This being the case, the same amount of money can be made to produce more terminal facilities to invite new business than could be provided if the more expensive type of construction were adopted. In our case in Seattle, the Port



Smith's Cove terminal. The 100-ton shear leg derrick loading passenger coaches for Federal Railway in Alaska.

Commission instead of having six terminals would have two, if concrete had been decided upon. It has not been demonstrated that concrete made of Portland cement is permanent in salt water. If it does not prove to be permanent, then the added cost of concrete is not in any way justified, and if it does prove permanent, then the physical life of the wharf would exceed its useful life, which is not economical.

No serious criticism has or can be well made of the use of the Port Commission reinforced concrete, fire proof warehouse construction, in view of the resulting longer life, decreased maintenance repairs, and fire insurance over any type of timber construction. On account of being relieved of the difficulties of foundation construction that we have in the



The Hanford Street terminal, showing cargo shed and the 1,000,000-bushel grain elevator.



The water side of the Stacy Street terminal, showing cargo sheds with warehouse in the background.



The Smith Cove terminals. Showing handling equipment consisting of a five-ton gantry crane, a fifteen-ton stiff leg derrick and two locomotive cranes.



5,000,000 gallons of soya bean oil, worth approximately \$6,000,000, piled on Smith Cove terminal's open wharf ready for bulking.



A general view of Seattle's central waterfront, showing the port's typical skyline.

concrete wharf, such as salt water, tidal changes, riprapping, etc., the difference in cost between concrete and timber construction for warehouses is not sufficient to warrant the adoption of timber warehouses. Again the warehouse is not subject to the radical change on account of improved mechanical freight handling devices as is the transit shed.

Terminal Railway

In the first place, the term "Terminal Railway" should be adopted and used instead of "Belt Line Railway", which has been used in this connection heretofore. The term "belt line railway" is misleading, since it is doubtful that a terminal proposition of this kind in Seattle would encircle the city. A terminal railway should consist of all the track facilities on the Seattle side of the classification yards, so that when cars are delivered to the above yards they are picked up by the terminal railway company and switched to terminal facilities and industrial plants.

That the terminal tracks on the Seattle side of the classification yards should be controlled and operated by a single management cannot be questioned. Also that same could be operated more efficiently and more economically cannot be questioned. That such articulation of the waterfront with railroads, steamships, warehouses and factory sites would be advantageous to commerce there is no doubt, advantageous to the terminal and industrial facilities without the least doubt, and advantageous to the railways there is also no doubt. At New Orleans the municipality, through a belt line railway commission, operates a 58-mile public belt line along the entire riverfront, with a large number of industrial sites, wharf and railroad switch connections, and provides almost complete co-ordination between the wharves, railroads and industrial establishments, and ultimately will encircle the entire city. Although the Southern railroads fought the establishment of this railroad, the leading officials of these same railroads today consider it a step in the right direction, and agree that it has been beneficial and satisfactory in regard to their operations and traffic considerations. The Seattle terminal railway would co-ordinate the public and private harbor improvements, railroads and steamship lines in a thorough and efficient manner, by

simplifying and decreasing the operation cost and facilitating the quick delivery of cars. The terminal railway would also equalize competitors on all waterfront and industrial sections of the city by establishing a new form of flat switching rate, abolishing the zone system of exorbitant charges, making impossible the duplication of switching bills. It would also invite new railroad and steamship lines to Seattle on a basis of absolute equality with the existing companies, and would be advantageous to the individual and the Seattle industries in assisting them in competition with other cities.

At the present time there is very little car drayage, for example, car movement from one industry or wharf to another industry or wharf, on account of the car shortage, especially since the railroads have been taken over by the Government. In fact, there has never been very much, because the railroads are not interested in this business—only in the long haul. However, after the war, in normal times, the terminal railway would increase this car drayage and build up the outlying industrial sections and put them in communication with the central portion of the city by cheap transportation, which would do more to build up Seattle than any one thing.

It is extremely important that all track and terminal facilities be operated under one management in order to eliminate a duplication of trackage and to develop industrial waterfront property.

The yards of the transcontinental railroads entering Seattle are not well laid out from a terminal point of view, and the various tracks of the different roads cross one another entering the business section of the city. In planning for a terminal railroad under one management we should have one well located classification yard instead of four, and also parallel all trackage and eliminate the conflicting crossings that we now have. Another evil of the present system that prevailed before the Federal Government took over the railroads was the duplication of operation. Almost any day along Whatcom Avenue in the East Waterway district one could see the four railroads each operating a switch engine, and serving the East Waterway properties with the use of the Milwaukee passing track, which is now a common user, whereas, a single loco-



A general view of the Hanford Street terminal from the water side.

tive operated efficiently by one organization could have taken care of all the switching without any trouble whatever.

The late Mr. Virgil G. Bogue, former New York consulting engineer and chief engineer of the Northern Pacific Railroad Company, is quoted from his report to the Seattle Municipal Plans Commission under the heading "Transportation", as follows:

"A terminal railway, owned and operated by the Port of Seattle would give all railways equal access to the districts served thereby, and new railways entering the city instead of gaining access to the waterfront by condemnation, could use the terminal tracks. This would invite new railroads to enter the city, while now, it would be almost prohibitive.

The plans suggesting methods of developing industrial and waterfront property all provide for switching tracks wherever necessary, whether along marginal ways or other streets. It is important that all these tracks and facilities be co-ordinated and operated under one management, serving the entire city and vicinity, for the following reasons:

1. It would eliminate the duplication of trackage and terminal facilities.
2. It would be an economic advantage to the community as a whole in the reduction of the amount of land used for yard purposes, and the land thus released would, in most cases, be desirable business or industrial property.
3. It would simplify and reduce the cost of operation.
4. It would greatly facilitate prompt delivery of cars.
5. It would make of the port and the city a terminal unit, which should work to the advantage of Seattle's industrial and business concerns, and assist them in competition with other cities."

The mere construction of terminals will not alone give the full advantage of the harbor which the people have a right to expect. There should be a comprehensive system of co-ordination for the interchange of freight between the railroads and the harbor, and it should be so provided that the beneficial effects of the cheapness of water transportation shall not be lost or even minimized as a result of such interchange.

Since we have increased our commerce in the last five years from \$120,000,000 to over \$500,000,000, we have the advantage of Montreal, San Francisco, New Orleans, and other cities operating a public belt line, and we are handling more business over our terminal facilities. The three ports mentioned are now all making a profit from charges of \$2.00 to \$2.50 per car for switching, and are handling less commerce over their docks, so there is no reason to believe that Seattle cannot do as well. Another advantage that Seattle has over these cities is that our private and public terminals are limited to a seven-mile waterfront, whereas at Montreal and New Orleans, especially, the terminals are more scattered, necessitating a belt line of over fifty miles, making the operation and maintenance most costly. Another extremely important advantage that Seattle has over these competitors is that we do not have to condemn practically any land for right-of-way purposes. Out of the \$5,000,000 appropriated by the Dominion Government of Canada for a municipally owned belt line at Vancouver, \$2,000,000 has to be spent for the condemnation of land for right-of-way and yard purposes.

Lighterage

In studying the engineering problem of freight transference along our waterfront, it is apparent that much study should be given to "lighterage". A "lighter" is a vessel with an open dock, used for the movement of freight about harbors or contiguous waters. A "barge" is a covered lighter. The term "barge" is used with a great deal of freedom, and is often misused. In planning our future harbor improvements, careful consideration should be given to affording ample facilities for the transferring of lighterage freight between vessels and between wharves and vessels, and vice versa. There should be slip room between piers equal to four or five times the widest steamship to be berthed, so that there may be sufficient space for the lighters on the off pier side.

The lighter is really a water dray, and works in competition with a land dray. There is no question but that lighterage is more economical than the railroad car or motor truck drayage, since the usual harbor lighter can transport from 500 to 800 tons



The outer end of Smith's Cove wharf, a structure which is over one-half mile in length.

of miscellaneous freight, while the land dray only carries from two to four tons. One lighter load may equal 200 or more dray loads. Including loading, delays, congestion and unloading, the time consumed by drayage would average several times as long. The one dominant provision to which everything else has been sub-ordinated, so as to secure rapidity, economy, and the least breakage, has been freedom from rehandling by manual labor.

Again, this mode of transportation would relieve congestion of car and vehicular traffic in the waterfront and industrial districts. The narrow strip of land paralleling the main waterfront is practically wholly occupied by the marginal street known as Railroad Avenue, so that it is very difficult to connect the north and south waterfront districts by rail on street grade without congesting this main thoroughfare and obstructing vehicular traffic that plies between the local passenger and freight docks and the business section of the city. Also, Harbor Island being separated from the mainland, as it is, makes railroad connections more difficult. The lighterage system will go a long ways toward solving this problem. Lighters are being used successfully and economically in New York, Baltimore and other United States harbors, also Oriental ports, so there is no reason why they should not be used just as advantageously in the Seattle harbor. At the Port of New York, seventy-five per cent of the freight is moved on lighters and similar vessels. It is true, of course, that some of this is caused by the few connections between the railroads and the piers. Railroad cars could also be lightered and freight loaded and unloaded direct between ship and car. Gondolas could be used in this manner, and if the method of lifting car roofs from box cars were adopted, as done in European countries, then the latter could be used likewise.

Public Ownership of Waterfront

Where the traffic of a port includes freight of a similar commodity or a few bulky articles, and is in the hands of a few large industrial companies and railroads to whose interests it is that the terminal facilities be adequate and unified, private

ownership and management of wharves and track connections may meet the requirements. At Duluth on Lake Superior, which is pronounced the best harbor on the Lakes, the waterfront and wharves are largely owned and administered by railroads and private concerns; at Galveston, Texas, a private wharf company, to whose interest it is to provide facilities and direct connections with railroads and industrial concerns, is meeting the demands.

At other American ports, however, with a large general trade, industrial, as well as commercial, the private ownership of waterfront and wharfage is unsatisfactory. Frequently it is not to the interests of the railroads, navigation companies, or private concerns owning the waterfront to promote a large general movement of freight by water, and it is difficult at times for independent vessels to find wharfage facilities. At all such ports it would seem that the necessary facilities and harbor unification can be best obtained by some degree of public ownership and administration. It is no mere coincidence that two of the most efficient ports in the United States are New Orleans and San Francisco, where state ownership and administration of wharves prevail. It is also significant that probably the best river terminal in North America is the Port of Montreal, which is operated by a public trust, a board of three Harbor Commissioners, appointed by the Dominion Government. When practically all the water terminal facilities are publicly owned and operated, as they are at the above three ports, conditions approaching the ideal are obtained, although the operation of the Port Commission facilities are upon an advanced plan, they being operated entirely by the public. In fact, Seattle is the only port in the United States where terminals are publicly operated. This method gives equal rights to all steamship companies, and will attract commerce to this port. The leasing of public wharves for long periods of time has proven inadvisable, and short term leases or leases revocable at the will of the port district may be advisable for a portion of the public frontage, but the major portion should be open to all vessels seeking loading or unloading facilities. The experience of the many

American terminals makes it clear that wherever a large general shipping business exists, the necessary harbor unification is best obtained through public control.

It is essential, whatever be the form of port administration, that the combined terminal charges on vessels and freight be reasonable. It has been the policy of the Port Commission from the beginning to reduce these rates in order to compete with other Pacific Coast ports. There is no doubt that this alone accounts for a large share of the increased commerce coming to our port. The rates should be at least as low as those of our rival ports.

Gradually the entire main waterfront of Seattle should be municipalized in order that the maximum use may be obtained from it at the minimum cost. Private corporations involve the necessity of proceeds over and above interest, and are subject to taxes, while public terminals are not subject to these additional burdens. Profits from public terminals can be returned to those who paid it, in the shape of increased accommodations and appliances for the benefit of trade. Under public ownership, charges are levied upon all classes of goods, and equally upon all individuals. Favoring of particular lines of trade is avoided.

Conclusions

Summing up the most important requirements for the future development of harbor and rail facilities of Seattle, it may be said that the following conclusions are most important, and no delay should be made in putting them into effect.

1. That the terminal railway plan, operated under one management, should be permanently adopted and made to include all track facilities on the city side of the classification yards, since it must be conceded that greater harbor efficiency will be obtained if a terminal railway is owned and operated by a single management.

2. That a comprehensive plan covering all the Seattle waterfront, including the Elliott Bay waterfront, Harbor Island district, Duwamish waterway,

Washington Canal and Lakes Union and Washington, should be prepared and approved by a majority of the representatives of the public boards and private companies interested and that same be followed as nearly as possible in the construction of new terminal facilities.

3. Since our harbor can only be built up by united effort, harmony, order and method, so essential to its development and successful operation, it is desirable that its waterfront improvement should not only be planned in a comprehensive way, but a municipal policy of control and administration should be involved with the development of the physical plan, which shall look to the gradual substitution of public for private ownership without undue hardship to the private companies.

4. That especial attention should be given to mechanical freight handling equipment, and that such installations which will lessen the handling cost of cargoes should be installed on our present harbor facilities.

5. That the timber construction type of wharf and transit shed be used in the building of new terminal facilities until such time that it is certain that a more permanent structure meets all requirements. Also that wooden construction be used in the building of temporary warehouses, and that reinforced concrete construction be adopted in the erection of permanent warehouses.

A general description of the Seattle Port Commission's terminal units follows:

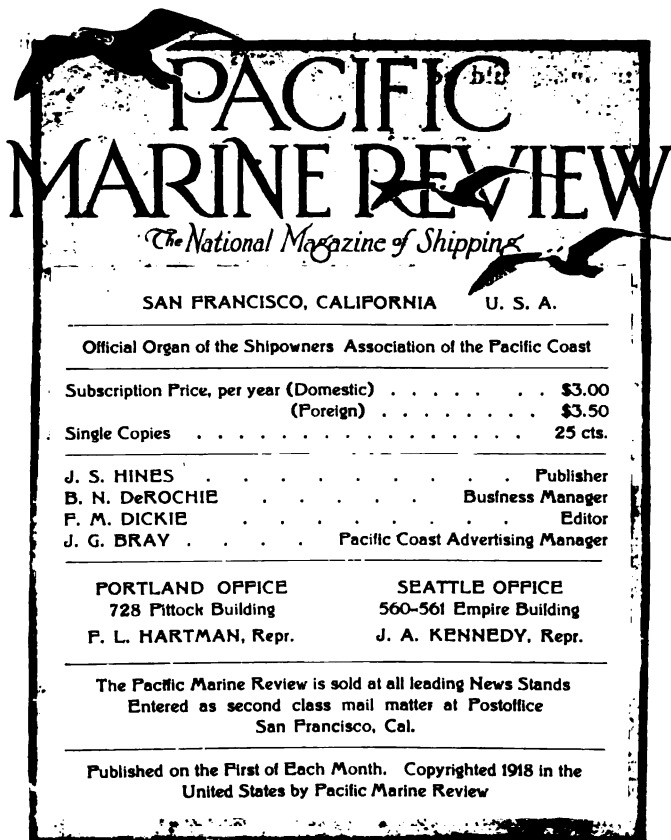
Smith's Cove Terminal

Smith's Cove, lumber, heavy machinery and general merchandise terminal, is one-half mile long and 310 feet wide; the largest pier on the Pacific. It is equipped with three miles of public railway tracks, a \$40,000 gantry traveling crane, which is electrically driven and lighted for night loading, and covers a section of the pier nearly 900 feet in length, and will reach the depressed tracks in the center of the dock, also 40 feet from face of pier, so that

(Continued on Page 102.)



The Spokane Street terminals, showing the seven-story cold-storage warehouse in the background.



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CONCRETE SHIPS AND THE CEMENT GUN

NOW that our Government has undertaken the construction of a considerable tonnage in concrete ships of large size, the matter of their economical construction has become a live issue. Naturally, a large, if not the largest, item in the construction of a reinforced concrete ship is the preparation of forms. In the consideration of forms, the question naturally arises as to the use of an outer form, guide wires as thickness gauges and the concrete gun for placing the mixture. The inner surface could be smoothed off, and the scrapings thrown into the mixture in order to avoid waste of material. In the matter of cost it must be remembered that the concrete construction of a vessel pertains to the hull only, and that engines and auxiliary machinery, outfit, etc., costs the same as in the steel ship. Thus, if it were possible to construct a concrete hull for a cost of forty per cent less than a steel hull of the same dimensions, this percentage would be very materially lessened when applied to the costs of the finished ships. Just what concrete hulls will cost per deadweight ton of carrying capacity is a matter of guesswork at the present time, since sufficient data has not been obtained upon which to base any close estimate. The first ships have naturally cost considerably more than their successors will, but it is to the interest of the concrete shipbuilding industry to show as low a hull cost as possible, and for this reason every method which gives promise of substantial savings should be thoroughly investigated.

OUR WATERFRONT PROBLEM

THE special Committee on Harbor Survey has reported to the Board of Directors of the San Francisco Chamber of Commerce, and this report forms a splendid basis from which to set out in the task of discovering just what San Francisco needs at the present time to enable her to take full advantage of her geographical position relative to the Orient and South America.

The function of the harbor authorities at San Francisco has been to supply wharves with transit sheds upon them and a belt railroad which allows a very free interchange of freight between wharves or from wharves to railroad systems and vice versa. In the carrying out of this function the body governing our waterfront has been highly successful. We have a splendid wharfage system. A study of the table below will show that our total tolls on ship and freight compare favorably with those of other Coast ports, while in the matter of docking capacity it was found that the dockage space was only fifty-four per cent occupied during January, 1918, which would indicate that there are enough wharves to take care of present conditions.

If we were to pick out one sentence from the report as carrying the crux of the entire situation, it would be, "Storage so close to the piers that freight can be handled to and from it by hand or electric trucks, thereby saving the present expensive drayage charge, is a necessity to this harbor in order to put it on an equality with other ports." Not only would an adequate system of waterfront warehouses materially reduce the total cost of freight handling on San Francisco's waterfront, but it would also remove the most prolific cause of freight congestion on our wharves,—the using of the wharf shed as a warehouse.

The Maritime and Harbor Committee of the San Francisco Chamber of Commerce which will follow up the Committee on Harbor Survey is made up of the following gentlemen: Miles Standish, chairman; Seth Mann, R. H. Swayne, A. T. DeForrest, T. A. Graham, J. R. Hanify, W. G. Barnwell, J. H. Polhemus, Lee Bayson, W. N. Moore, J. H. Rosseter, A. E. Anderson, A. C. Reid, W. T. Smith and F. S. Moody. In conjunction with the work of this able committee there will be another body of well known men studying the administration of custom affairs at the port in an effort to smooth out any custom house procedure which tends to restrict foreign trade. While these two committees are working, two other independent committees representing importers and exporters and river and bay commerce interests will be at work and present their findings to the Harbor Board for consideration. One of these committees will take up the matter of port tolls and the distribution of the burden between ship and freight and the other will take up the matter of cargo handling facili-

ties. The work of these four large and able committees should result in much valuable data from which can be based the essentials necessary to complete port success. The work of the committees will not conflict, as each is striving for a solution of a different phase of harbor management, and the Harbor Board itself is acting in a wide open manner and welcoming the work of these committees by the aid of which the Board will be able to shape the future policy of the waterfront administration.

In the matter of different port charges, the table below will be found of great interest. This table was compiled by the Harbor Survey Committee, and gives a comparison of the loading and unloading costs at Pacific Coast ports, including handling to cars; showing amounts borne by vessel, amounts borne by cargo and total costs, taking a typical case, a vessel of 2800 net registered tons: draft 23

feet, 6500 tons of cargo from the Orient, pilot employed, 1000 tons of bunker coal taken, 100,000 gallons of water taken at the dock and time of discharging 10 days. The Puget Sound wharves make no extra charge above published rates for high piling and long trucking, while for such work in San Francisco an extra charge is made.

OUR COVER

WE are indebted for our cover picture this month to Mr. Albert E. Price, whose offices are located in the Arcade Building, Seattle, Washington. It has been a great pleasure to us to use this beautiful photograph on our cover, as it is one of the best we have yet seen. The photographer secured the picture while on board the Sound steamer "H. B. Kennedy", and if anyone is interested in obtaining a hand-colored copy, Mr. Price will be glad to furnish same.

	For Through Rail Haul Railroad Absorption Out						For Local Rail Shipments						For City Delivery					
	Vessel	Net cost per ton	Cargo	Net cost per ton	Total	Net cost per ton	Vessel	Net cost per ton	Cargo	Net cost per ton	Total	Net cost per ton	Vessel	Net cost per ton	Cargo	Net cost per ton	Total	Net cost per ton
SAN FRANCISCO	6472.50	1.00	325.00	.05	6797.50	1.05	6472.50	1.00	3250.00	.50	9722.50	1.50	6472.00	1.00	325.00	.05	6797.50	1.05
SEATTLE R. R. Dock	3330.00	.512			3330.00	.512	3330.00	.512	4225.00	.65	7555.00	1.162	3330.00	.512	4225.00	.65	7555.00	1.162
SEATTLE Private Dock	3323.00	.511	3900.00	.60	7223.00	1.111	3323.00	.511	7800.00	1.20	11123.00	1.711	3323.00	.511	5525.00	.85	8848.00	1.361
SEATTLE Port Dock	3328.30	.512	3575.00	.55	6903.30	1.062	3328.30	.512	5850.00	.90	9178.30	1.412	3328.30	.512	3575.00	.55	6903.30	1.062
VANCOUVER R. R. Dock	3012.00	.463			3012.00	.463	3012.00	.463	8775.00	1.35	11787.00	1.813	3012.00	.463	5525.00	.85	8537.00	1.313
VANCOUVER Private Dock	3012.00	.463	2275.00	.35	5287.00	.813	3012.00	.463	8775.00	1.35	11787.00	1.813	3012.00	.463	5525.00	.85	8537.00	1.313
VANCOUVER Gov. Dock	2997.00	.461	650.00	.10	3647.00	.561	2997.00	.461	7150.00	1.10	10147.00	1.561	2997.00	.461	3900.00	.60	6897.00	1.061
TACOMA R. R. Dock	3330.00	.512			3330.00	.512	3330.00	.512	4225.00	.65	7555.00	1.162	3330.00	.512	4225.00	.65	7555.00	1.162
TACOMA Private Dock	3445.00	.529	1300.00	.20	4745.00	.729	3445.00	.529	7800.00	1.20	11245.00	1.729	3445.00	.529	5525.00	.85	8970.00	1.379
PORTLAND R. R. Dock	3332.50	.512			3332.50	.512	3332.50	.512	4225.00	.65	7557.50	1.162	3332.50	.512	4225.00	.65	7557.50	1.162
PORTLAND Private Dock	3332.50	.512			3332.50	.512	3332.50	.512	6500.00	1.00	9832.50	1.512	3332.50	.512	4875.00	.75	8207.50	1.262
PORTLAND City Dock	3332.50	.512			3332.50	.512	3332.50	.512	6500.00	1.00	9832.50	1.512	3332.50	.512	4875.00	.75	8207.50	1.262

FUEL PRICES

COAL			
SAN FRANCISCO			
British Columbia Coal, barge,	\$12.50 plus \$.35 trimming		\$12.85
SEATTLE			
British Columbia Coal, barge,	7.20 plus 1.00 trimming and loading	8.20	
Washington Coal, barge,	6.50 plus 1.00 trimming and loading	7.50	
Washington Coal, bunkers,	6.50 plus .30 trimming	6.80	
VANCOUVER			
British Columbia Coal, bunkers,	6.50 plus .15 trimming	6.65	
TACOMA			
Washington Coal, bunkers,	6.50 plus .35 trimming	6.85	
PORTLAND			
Washington Coal, bunkers,	7.75 plus .20 trimming	7.95	
Washington Coal, barge,	8.25 plus .20 trimming	8.45	

OIL		
		Oil cost equivalent to 1 ton of coal
San Francisco	\$ 1.48 per bbl.	\$4.81
Richmond	1.45 "	4.71
Seattle	1.72 "	5.69
Vancouver, B. C.	1.78 "	5.78
Tacoma	1.74 "	5.65
Portland	1.72 "	5.39

Note.— $3\frac{1}{4}$ barrels of fuel oil are equivalent in steaming value to 1 ton of best British Columbia or Washington coal.

THE FIRST SHIP

OREGON has gathered in the honor of delivering to the Emergency Fleet Corporation and sending to sea the first completed wooden ship of the mighty flotilla that will compose the merchant marine of the United States, and which is intended to aid in winning the war. The vessel was the "Wasco", 286 feet in length, 46 feet in width, and capable of churning along with 3600 tons of freight under her hatches at the rate of twelve knots each hour. The big wooden freighter was registered under Government ownership at Portland, Oregon, June 9th, and left down the Columbia River for the open sea at 10:15 a. m. on Wednesday, June 10th. Every pin, rope and item of equipment was in place and ready for use. The dates are particularly set down, because it is an historic event. It was the first response to the undersea murder campaign of the Hun. It was the answer to President Wilson's call to labor. It was the contribution of a man who is building ships without retaining a nickel of the profits for himself, but who is putting portions of his private resources into Red Cross Work and giving other gobs of the coin for the relief of suffering among the allied nations, and to the support of Government activities. Doubtless there are other American citizens who are backing the boys in the trenches, as is Eric V. Hauser, hotel man and contractor, and their stories ought to be told for the encouragement of American spirit. The stories of such work are worth telling. Portland and Oregon were first over the top in the Third Liberty Loan Drive because of having organized a working machine in advance of the date for securing the money. Mr. Hauser gave Portland the honor of furnishing the first wooden ship to the Government, because of having organized his shipyard into a machine for whipping the everlasting tar out of Germany. So earnest are the men that they will have delivered four more wooden ships to the Emergency Fleet Corporation on or before July 10th. They are the "Biloxi", "Kasota", "Blandon" and "Boilston", the "Biloxi" having been delivered to the Government under full steam and in perfect and complete operating condition on June 18th, nine days after the "Wasco" was delivered. They are sisters to the "Wasco" and of the same type and size. Seven others are in the water, and men are swarming over them in the work of fitting their equipment. Enthusiasm is the keynote of operations out at the shipyards where those boats were constructed. Heavy timbers swing into place to the music of popular war songs, as whistled by the men. Mechanics are on edge to get their particular job completed, because they realize that the boat on which they work is needed to carry forward the supplies the army wants, and because the people of Portland honor the men in the ship-

yards, as they do the men in the trenches. That combination of workers and sentiment is what is going to give the Emergency Fleet Corporation a fleet within the next six months. So strong is their belief in themselves that the men of the St. Johns shipyard have placed a certified check for \$10,000 in the hands of Meyer Bloomfield, of the Fleet Corporation, to back up their claim that they can build more ships and build them faster than any other wooden shipyard in America. These men are the sort of fellows who "eat this war stuff". When a Red Cross subscription is announced, or a Liberty Loan, the shipyards' boys say "how much from us". Then they set aside so many day's pay for each man. And just inside the front gate of the big yard is a liberty rail, painted red, white and blue. On it any slacker is ridden from the enclosure. It was not always thus. In the summer of 1917, Eric V. Hauser happened to be living in the big fir district of America, when the necessity for wooden ships was announced from Washington. He had retired after years of railroad building as a member of Grant Smith & Co., of St. Paul. Hauser had no shipbuilders at hand, but he knew the men of the old Grant Smith crew. Messages over the wires brought them together at Portland. They looked at the plans for a wooden ship of the Hough type, and said they could build it. Hauser took their word for it, and accepted contracts from the Government for about thirty ships. In September the keels were ready to be laid down; but workmen who had been assembled got some kind of grievance in their minds and went on strike with shipyard workers at other plants. After the men went back to work in November, 1917, Mr. Hauser devised a plan to put them on edge, giving them "pep", and make them see the importance of their labor in the great scheme to win the war. He arranged for the foremen of each shift to meet him at luncheons and dinners, spread at his great Multnomah Hotel, the finest institution of its kind in the Northwest. At these dinners he convinced the men of his friendship and interest in their prosperity; he had Dr. Wm. T. Foster, among others, tell them of the horrors he had seen along the German trail in Belgium and in France; soldiers from the front told the shipbuilders their stories, and every speaker asked for ships, and quick delivery. Out at the yards a band was organized to entertain the men during luncheon hours, several times each week patriotic speakers addressed the men, baseball teams were organized, a newspaper was printed, carrying only shipyard news; bonuses were given workmen who were drawing a minimum of \$3.25 and a maximum of \$6.00 each day; a community house was constructed where the men are furnished shower baths, amusements and lockers for their clothing. The "Wasco", first ship delivered to the Emergency Fleet Corporation, and her sister ships, are the first



Mr. Eric V. Hauser, Portland shipbuilder.

syllable of the answer the men made. When the representatives of the Emergency Fleet Corporation, Lloyd J. Wentworth and J. W. Hall, cast loose the hawser and seized the halyards to raise the pennant of the corporation over the first wooden ship to be delivered to the Government, 3000 workmen stood on the wharf and clung to the ribs of embryo ships on the ways to cheer the departure of their first gift to Uncle Sam. They were proud of it.

NATIONAL ASSOCIATION PROPOSED

THE Pacific Shipping and Maritime Committee of the Associated Chambers of Commerce of the Pacific Coast has been seeking the consensus of opinion among the steamship owners of the United States in reference to the formation of a National Association of Steamship Operators. The suggestion is made that perhaps the American Steamship Association of New York might serve as the parent institution, that branch organizations be formed on the Gulf Coast, the Pacific Coast and the Great Lakes. That these branch organizations would be composed of coastwise and deep sea subdivisions and that these divisions could formulate local policies. The central organization would serve as a sort of clearing house for American steamship opinion.

The reasons why the formation of such an association should be carried out are many and important. In reading over the many hearings which have been held in Washington on legislation affecting steamship interests, one is struck by the wide

differences in opinion met with in the arguments of steamship owners and the extreme range covered in these arguments must have been more or less confusing to the Congressmen and Senators who were carrying on the investigations. A National Association of Steamship Owners, however, could speak authoritatively on legislative matters as the steamship operator as a whole saw them. The suggestions of such an association to Congress or to the Shipping Board would carry more weight and be more to the point than the more or less conflicting suggestions of numerous individuals.

The close of the war will find the United States Government in possession of a great fleet of merchant vessels and the country must then face the problem of their retention under public ownership, their distribution among private owners under strict Government regulations as to their operation or their unrestricted return to private trade. Either one of these problems will be a difficult one to solve, and no matter which course is adopted by our Government, the advice and co-operation of an Association of Steamship Operators would prove of untold benefit to the entire country.

SHIPBUILDING PROGRESS

THE announcement by the Shipping Board of the completion of 263,571 deadweight tons of shipping during the month of May has proven welcome news to the allied nations. While the tonnage is large, larger than many critics would have conceded possible several months ago, there is a deeper significance in the announcement than is carried by the mere completion of so much carrying capacity. This output means that the shipbuilding industry, which has undergone the throes of what has been perhaps the greatest expansion of a single industry which has ever taken place in history, has at last struck its stride, and when we remember that there are a considerable number of new yards which have yet to launch their first ship, and that production is becoming more rapid in every other yard in the country, we may rest assured that each succeeding month will show an ever-increasing output. The shipbuilders, engine and machinery makers, the steel producers and the Shipping Board officials are all worthy of the highest commendation of the country for the splendid showing which they have already made and for the certainty that they are ever forging upwards towards the high-tide mark.

Commissioner Bainbridge Colby of the United States Shipping Board is expected to visit Seattle sometime during July, according to word received from Washington, D. C. Mr. Colby is on an inspection tour of the Pacific Coast shipbuilding plants.



Mr. David Rodgers, general manager Skinner & Eddy Corporation.



Flag-raising ceremonies at the Skinner & Eddy yard Number One.

Seattle's Record Makers

IT is a long cry from a sand lot to a shipyard with 225,000 tons of completed tonnage to its credit, yet it is only a little over two years ago that the Skinner & Eddy Corporation began the construction of its plant on a bare piece of ground, consisting of about five acres, and covered with one foot of snow. At about the time they engaged in this business, the excessive demand for ships began to set in, and Mr. Skinner, foreseeing clearly the demand that would surely follow as a result of the undersea activities, began to provide liberally for steel and equipment with which to construct a number of these vessels. Realizing that in massed production the greatest possible speed in output was obtainable, they developed the now famous 8800-ton type, and the keel of the "Niels Nielsen", the first of this fleet, was laid on May 2, 1916. Since that time this firm has built twenty-one vessels of this type, and three 10,000-ton oil tankers, or a total of 225,000 tons, which is thirty per cent more than the entire amount built in all of the shipyards in the United States in 1915.

When the keel of the "Niels Nielsen" was laid, there began a career of rapid ship construction which was never witnessed before and, continuing on down through these two short years, has been accelerated until the time now consumed in the construction of these vessels has been reduced to fifty-five days for launching, and an average of twenty days for commissioning or, a fully equipped vessel, complete with all military requirements as now developed to combat the submarine menace, and capable of carrying 8800 tons deadweight, is an actual reality in seventy-five working days.

The notoriety given to the launching of a vessel, has created the erroneous impression in the minds of the public that this achievement marked the addition of new tonnage to our merchant marine, whereas, if a vessel is launched, only it is of no more service to the nation than if she had never left the keel blocks. The acid test is the actual completion of the vessel, tried and delivered and entered upon the service. For publicity purposes, effort has been centered on some vessels to launch



View of the five ways in yard Number One of the Skinner & Eddy Corporation.

them in record time. That the Skinner & Eddy Corporation has not resorted to this kind of publicity is evidenced by the consistent manner in which they have gradually reduced their building time over their entire program. When one reflects that some ten or twelve months were consumed in the construction of a ship of this size in the pre-war days, some idea of the remarkable achievement may be gained.

When this firm entered the shipbuilding business, their energies were largely employed for the first three months in 1916 in preliminary work of creating an organization and the assembly of equipment, a task accomplished in a remarkably short time, when all of the difficulties of securing machinery and equipment are considered, since the manufacturers of implements of war had engaged the capacity of the builders of such tools as were essential for installation in shipyards. These difficulties

were further aggravated by the congested conditions of the railroads prevailing at that time. Yet, in spite of these handicaps, a prompt accumulation of the necessary facilities was accomplished and these obstacles overcome by the creation of effective purchasing departments and the installation of a traffic division.

Mr. Skinner's remarkable ability for surrounding himself with efficient associates was again demonstrated in the selection of David Rodgers, who, today, is known around the world as one of the greatest masters of the shipbuilding industry. His wonderful knowledge of fashioning a ship, his determination to over-ride obstacles that would halt the progress of a man of less resource, his firm but kindly disposition toward his men, his record for fair and square dealing, act as a magnet, and he promptly surrounded himself with able and loyal lieutenants and an organization of efficient shipbuilders who have set the pace for the country ever since.

Realizing the necessity for freedom of action, this firm adopted unconventional methods that the work might be pushed forward to completion with the greatest celerity and the usual red tape and routine that shackled progress heretofore was promptly dispensed with. Entering upon their work with a spirit of enthusiasm and goodfellowship this organization soon began to make its efforts known. On September 21, 1916, the first vessel took the water and was delivered on November 9th. From that day on they gradually shortened the time until on November 1, 1917, they startled the country by the launching of the S. S. "War Flame", built



Scene in one of the rooms of the Skinner & Eddy hospital, which is one of the most complete shipyard hospital units in the Northwest.



Some wonderful construction records have been created on these building ways.

for the account of the Cunard Company, and commandeered by the Shipping Board and renamed the "West Arrow", in sixty-four working days. On November 24th they launched, for the account of the United States Emergency Fleet Corporation, the first direct contract ship to be built for their account and named in honor of the city in which she was constructed. Since that time they have delivered nine direct contract ships to the United States Shipping Board, six of which completed the first contract taken, and three of which apply on a contract taken as late as January 15th, of the present year. These vessels averaging about four months earlier than the promise outlined to the Government at the time of negotiating the business. In fact, the first contract for six vessels was completed before the Board had received a direct contract steamer from any other source in the United States with the bare exception of one small vessel built on the Great Lakes and delivered one day previous to the completion of the sixth ship. The last turn of their building berths has been accomplished in fifty-five working days. If this record were maintained over the entire steel ways now in existence in the United States a most gloomy aspect would present itself to the Kaiser's undersea pirates.

In August, 1917, this corporation extended their ways from three to five sets to help answer the call of the nation for more ships, and on June 1st their facilities were increased to ten building berths by absorbing the plant of the Seattle Construction & Dry Dock Company. During the month of May

this firm was awarded a contract approaching one hundred million dollars, the largest contract ever given to a private yard by the Shipping Board, in recognition of the very valuable services they had rendered to the nation. One thing that has contributed largely to the success of their program has been the installation of their overhead facilities for handling steel on to the ships. A unit designed and patented by General Manager David Rodgers. There further developed under his guidance a scarphing machine, which has now been placed on the market and sold freely to the American and English shipyards.

The organization has depended solely on individual efforts in obtaining materials with which to

A BUTTON WILL BE PROVIDED. EACH MEMBER UPON SIGNING SLIP.



Bulletin board in the yard of the Skinner & Eddy plant. The notice in regard to providing buttons for members refers to the Employee's Relief Association, now comprising over ten thousand members.

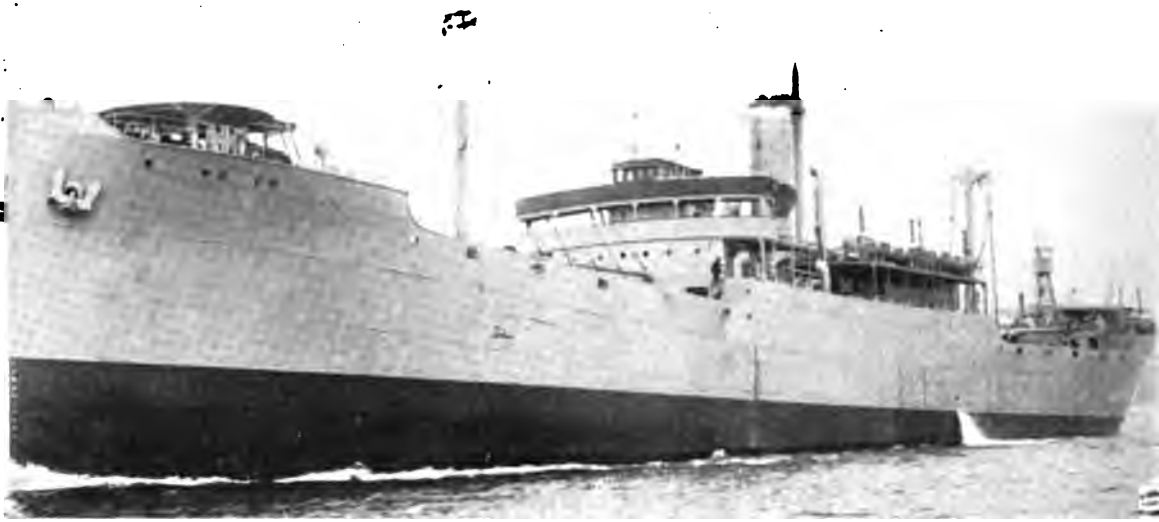


Mr. J. W. Eddy, vice-president Skinner & Eddy corporation.

Bushnell photo.



Mr. D. E. Skinner, president Skinner & Eddy Corporation.

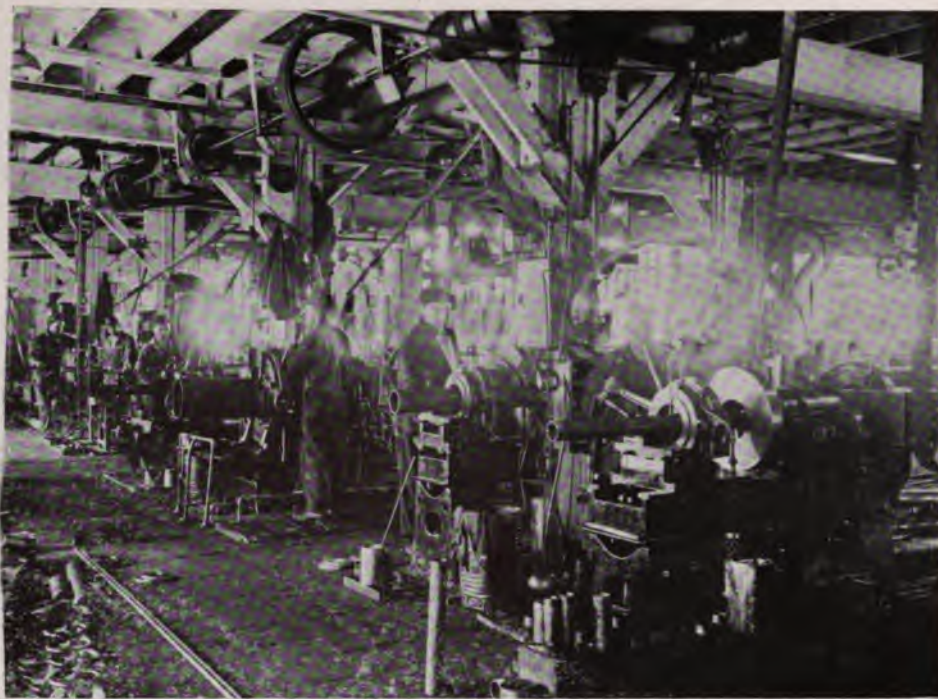


The "Ossimeke", "Trontalite" and "Western Queen", three recent products of the plant of the Skinner & Eddy Corporation.



Mr. H. C. Seaborn, second vice-president Skinner & Eddy Corporation.

Bushnell photo.



A view of some of the pipe-cutting machines in the pipe shop.

construct their vessels, and has spared no expense in securing deliveries, expressing where necessary at an extreme cost, several units in order to avoid an interruption in their building program. At one time it ran a through train from Schenectady, New York, to Seattle, Washington, with three turbines which arrived on the eleventh day.

The loyal manner in which the men have responded is evidenced, not only in their untiring efforts, to give the best in them to the concern, and through them to their country in its hour of peril, but is further reflected in their generous contributions to the Red Cross Funds and the Liberty Loan drives. In addition to the liberality expressed through these two channels they have organized "The Employees' Relief Association of the Skinner & Eddy Corporation", now comprising over 10,000 employees, and they donate each month a sum far exceeding \$10,000 to this work. The motto of the firm is "Play Fair", and this spirit pervades the entire organization.

One reason for the tremendous success attained by the Skinner & Eddy Corporation is due to the fact that the employees of this organization work "with" and not "for" its executives, and there is

a vast difference between the two standards.

David Rodgers knows his men, knows them by name, knows their needs, participates in their pleasures, sympathizes with them in their sorrows, and this intimate touch has led to the greatest co-operation through all departments. From each rivet boy to every departmental head, he is honored and respected. His word goes, and his every request is met with an "I will" so, under his management, the plant swings merrily along, happy in the knowledge that each day's labor contributed is helping

to bring to a satisfactory termination this world's conflict, and as long as this need exists, they can be depended upon to answer and will be able to say to the world their part is performed.

The task of putting in slip and building foundations, assembling equipment and organizing the working forces of a shipyard is a most difficult one, and the remarkable speed with which the Skinner & Eddy Corporation accomplished the bringing together of a group of competent men to head the different departments, assembled tools for their large ship tool shed, rushed buildings and slips to an early completion, secured a force of competent draughtsmen, and simultaneously



A view looking through the punch shop of the Skinner & Eddy plant.



New machine shop and foundry building nearing completion.

started the design and construction of large steel ships, will always remain one of the most marked among the many remarkable feats which have featured the conduct of American industry under the stress of war conditions.

Large punches, flanging presses and bending rolls, to say nothing of timber, piles and steel-construction material, were secured despite the chaotic condition of the world's markets, foundations for slips were rushed and actual construction commenced within a space of time that surprised the most optimistic.

As will be gathered from the accompanying illustrations the Skinner & Eddy Plant is in many respects an unusual shipyard. The buildings are of the heavy mill construction, so usual to the Northwest, and the usual extensive trackage system is found throughout the yard with large locomotive cranes for general handling. Over the building ways is the trolley system, this method so universally used now by shipyard in the Northwest, was practically originated at the Skinner & Eddy plant.

The three original building ways have now been increased to five,

while the addition of the plant of the Seattle Construction & Dry Dock Company will more than double the potential output of the firm.

Some idea of the remarkable growth of the work turned out is evidenced by the fact that the concern was forced to construct a large new machine shop and foundry building to care for its needs along these lines.

Of all the buildings in the big plant, however, perhaps none holds a greater interest than the hospital, a splendidly equipped building with

doctors and nurses in constant attendance.

The employees of Skinner & Eddy have always evinced great loyalty to the firm, and it is this spirit of co-operation and comradeship which has enabled the big Seattle shipyard to create so many building records and to have attained such a widespread fame throughout the length and breadth of the United States.

It is the emulation of this spirit throughout the shipyards of the United States which has resulted in a material increase in tonnage output being shown with each succeeding month's returns, and it is this spirit which has written the word "futile" on the Hun's inhuman methods of maritime warfare.



A corner in the well equipped joiner shop of the Skinner & Eddy plant.



Mr. J. F. Duthie, president and general manager of J. F. Duthie & Company.

One of Seattle's Great Institutions



The shear legs and fitting-out wharf at the Duthie plant.

ONE of the largest and most imposing of Seattle's steel shipyards is that of J. F. Duthie & Company. This company might well be called one of Seattle's pioneer shipbuilding firms, for it was established over nine years ago, and with Mr. J. F. Duthie as its president and general manager, has forged steadily ahead to the position it now occupies as one of the most important shipyards on the Pacific Coast.

The yard is situated on a twenty-four acre tract on what is known as Harbor Island. The four ship ways divide the plant, the steel shop being located on the one side, and the machine shops, woodworking shops, pipe shop, outfitting wharf, etc., on the other. At the end of the ways is a storage space for fabricated steel and back of this is the steel construction tool room, the superintendents' offices, plant hospital and power house.

The steel storage yard, 250 feet by 500 feet, is situated on the south side of the plant. Adjoining this is the lay-out shed, 50 feet by 350 feet. This shed is fitted with overhead traveling cranes and individual wall cranes for each of the tools. Next are the two steel shops, each 64 feet by 500 feet, and at one end of these are the bending slabs and furnaces. At the other end, convenient to the laying-out shed, is the mould loft, 80 feet by 210 feet. Thus, the steel follows a straight path from the storage yard through the lay-out shed and steel shop, then direct to the ships.

In the steel shop, which is served by overhead traveling cranes are sixteen punches, four shears, gate shears, angle shears, thirty-foot bending rolls, two large planers, countersinking machines and riveting machine, ample equipment to handle steel for twenty ships a year, which is the program planned. At each machine are fitted cantilever wall cranes, propelled by air motors, a great improvement on the old fashioned method of piling and hauling around by hand. Air hoists are also provided in place of the time worn chain blocks. This equipment enables the workmen to turn out thirty per cent more work with a minimum of effort.

Aerial cableways, so popular in the Northwest, serve to hoist material aboard the hulls, but unlike most yards, J. F. Duthie & Company has installed four cables over each ship, instead of the customary two, which will of course handle more steel than a two-line system.

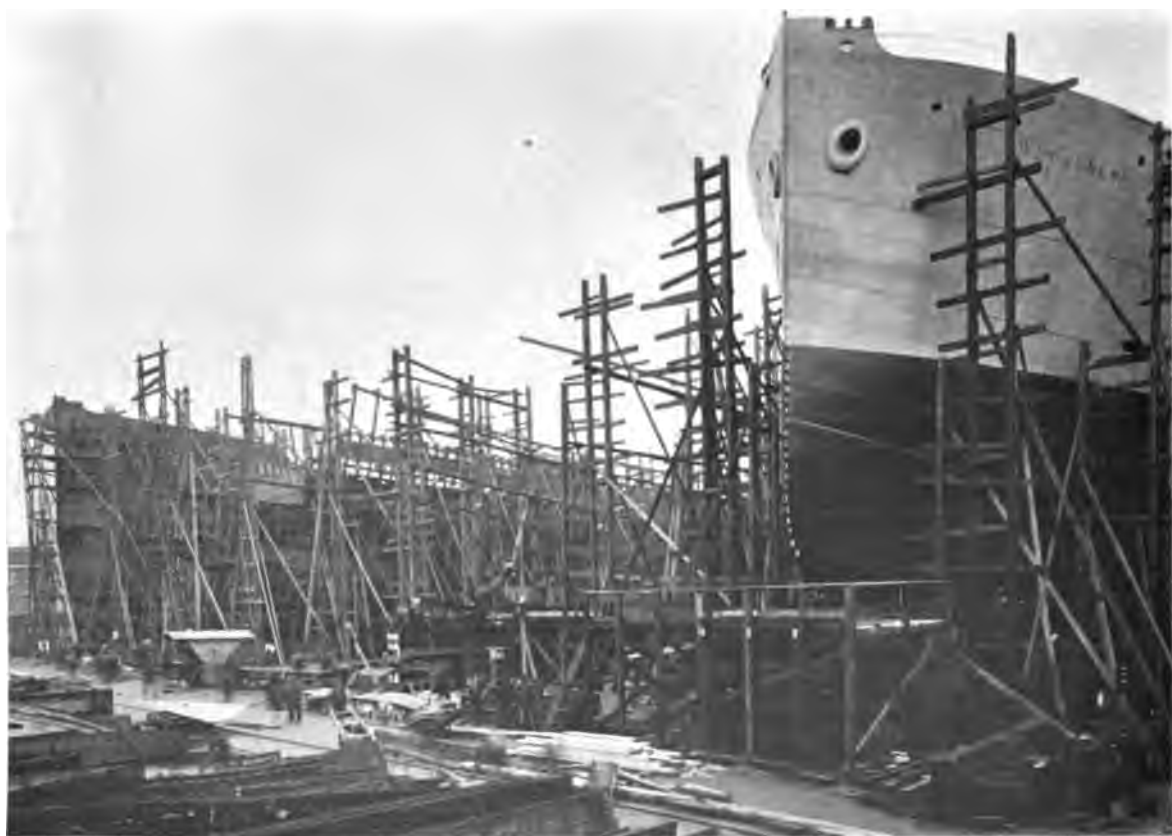
Adjoining the ship ways at the north is a building 55 feet by 350 feet, in which are located the pipe shop, copper shop and electrical shop. Ample space is provided for storage of pipe, and the location is most convenient to the outfitting wharf. Immediately north of this building is the blacksmith shop, 100 feet by 100 feet, and machine shop, 100 feet by 250 feet. These two shops, located in one long building, are served by 10-ton overhead traveling cranes, and the forge shop is provided with necessary jib cranes to handle heavy material at the hammers. North of this building is the boiler-makers' shop, in which J. F. Duthie & Company do all of the work on the boilers, except the assembling, then the woodworking shops, 75 feet by 300 feet, in which are located the patternmakers, joiners and shipwrights.

All of the above mentioned buildings face upon the outfitting wharf, 125 feet by 600 feet. Two ships can easily be handled at one time at this dock, which is equipped with shear legs and a traveling gantry. The shear legs will handle 75 tons at 60-foot reach, and the gantry, which is of the tower whirler type and travels at full length of the dock, will lift 5 tons at 75-foot radius.

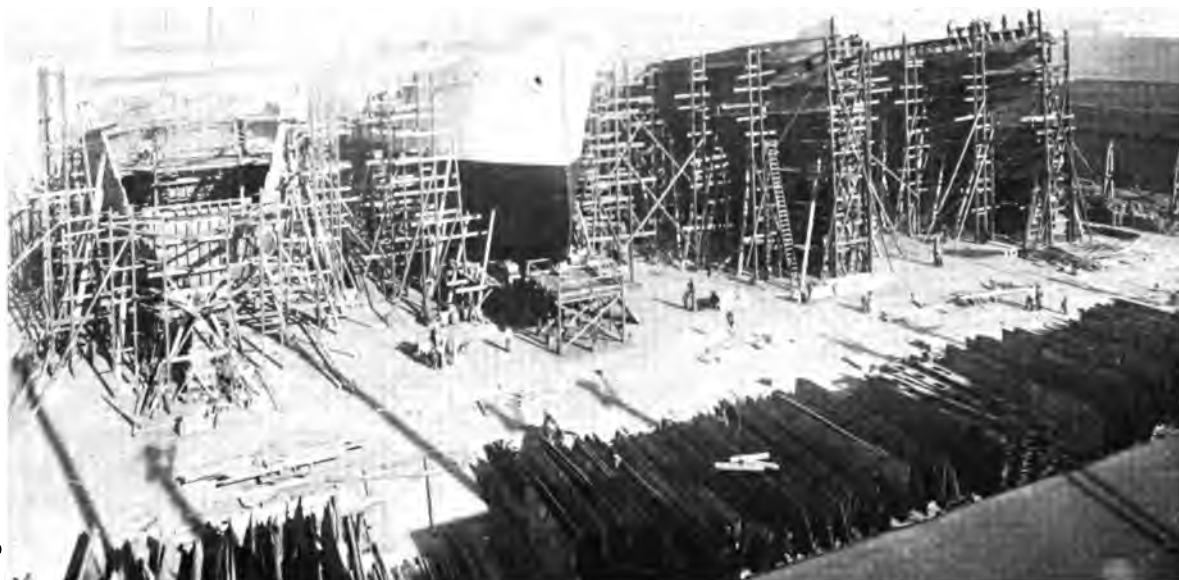
Work has been started upon an addition to the plant, consisting of three additional ship ways, with all of the shops necessary to take care of the additional material required to supply these ways, including two plate shops, each 64 feet by 400 feet, lay-out shop, pipe shop, power house, tool room, offices, etc. There will also be an additional storage yard, served like the present one with circular cranes, which cover circles of 80-foot radius. The mould loft, 80 feet by 200 feet, has already been built, and work has been started upon the moulds for a new type of ship which will be built on the new ways.



Four big freighters at the fitting-out wharf of the J. F. Duthie & Company shipyard.



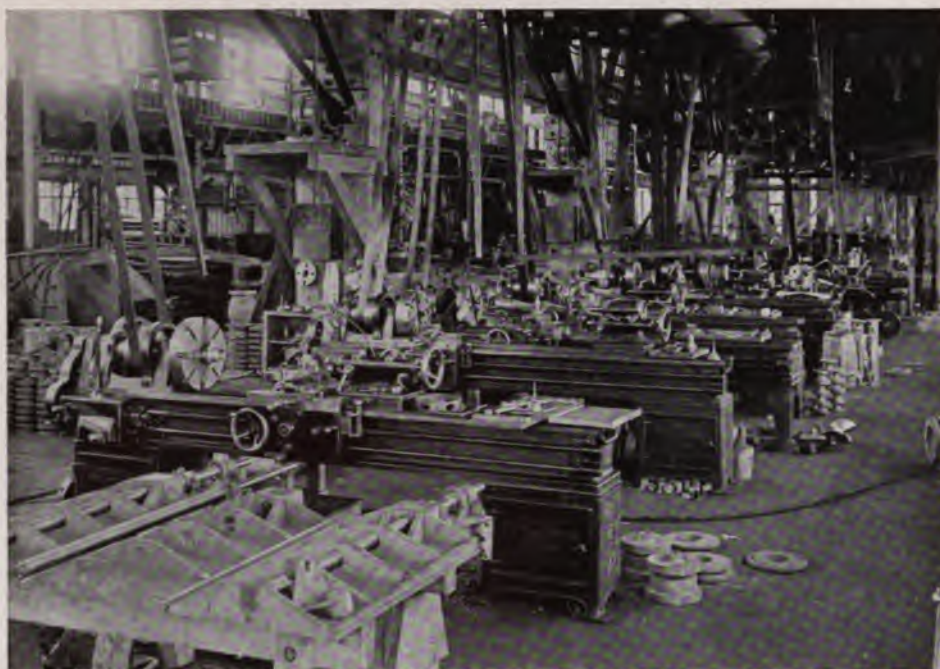
A close-up of the building ways at the Duthie plant, with the "War General" ready for launching.



With these five building ways, and the three new ones to be constructed, the Duthie plant will have a capacity of twenty ships per year.



Looking down upon four steamers being fitted out at the J. F. Duthie & Company's shipbuilding plant.



A battery of lathes in the machine shop of the J. F. Duthie & Company's shipbuilding plant.

The plant has outgrown the present restaurant, and has started work upon a new one, which will accommodate 1500 men at one sitting.

J. F. Duthie & Company broke ground for their new plant on September 10, 1916, and on November 29, 1916, the keel of the first vessel reposed on the keel blocks, and a completely finished plant stood ready to turn steel into ships as fast as it arrived.

This company has a great many fine vessels to its credit, as well as several records for delivery, among them being the S. S. "Western Sea", launched on May 25th, and completely finished and inspected on June 7th.

Mr. Duthie, president of this company, not only possesses the experience necessary to make a successful shipbuilder, but he is to be admired for his courage and tenacity in developing the huge organization now bearing his name, despite tremendous odds to be overcome during his first few years as a shipbuilder. He has accomplished much, and has largely contributed to making Seattle the center for an industrial activity in shipbuilding such as has never before been known in the history of the Pacific Coast.

His company has adopted for its slogan: "Speed, efficiency and co-operation", and has been able to

accomplish wonderful results with utmost speed, consistent with high efficiency, and has been fortunate in the choice of its men, who have given their heartiest co-operation to make this possible.

(Continued from Page 83)

FUTURE DEVELOPMENT OF HARBOR AND RAIL FACILITIES FOR SEATTLE

cargo can be loaded direct from car to ship, and vice versa. Also a \$16,000 structural steel 100-ton shear leg derrick for heavy lifts, and two locomotive

cranes of 15 and 35-ton capacities each, which are indispensable for handling freight on the open wharf. Two sheds of 140,000 square feet, protected by an automatic sprinkler system, supply a large area for dry storage of lumber, bag grain, salmon and general merchandise. The open wharf has proven advantageous for the transshipment and storage of lumber, oil, steel and machinery. Two underground concrete oil storage tanks, of 8000-barrel capacity, have been constructed to facilitate the handling of oil. This type of construction does not take up valuable dock space, and the several compartments formed by the roof supporting walls, are very necessary on account of the many small shipments of the different kinds of oil. Also pipe lines have been provided together with dumping



The plate storage space is served by stiff-legged cranes with long booms, covering a large area.



The main bay of the machine shop, showing the character of the work handled in this shop.

table and centrifugal pumps for the economical handling of oil to tank cars.

Bell Street Terminal

Bell Street public wharf and transit shed is a two-story sprinkler protected dock with nearly 1200 feet of deep water frontage. The two floors each have approximately 60,000 square feet of space. The shed is equipped with three Barlow marine elevators, so arranged as to be lowered to the water's edge at any stage of the tide, enabling vessels to easily load or discharge freight from port hatches. Each elevator has a lifting capacity of ten tons. Five public spurs connect the wharf with railway tracks running parallel to the waterfront.

The Bell Street reinforced concrete warehouse is 422 feet long and 80 feet wide, and is used mainly as a general storage warehouse, although the north 100 feet is equipped as a modern cold storage plant with compressor machinery in the basement, and five floors of cold storage rooms above. About thirty strictly modern offices occupy the top floor. Approximately a dozen of these are required as the headquarters for the Port Commission, and the remainder are rented out.

That portion of the waterfront where the Bell

Street terminal is located, was practically cut off from the adjacent part of the city by very steep grades. In order to overcome this, a system of inclined roadways has been built, which makes it possible to reach the business and public market district from the waterfront on grades not exceeding five per cent. In connection with these inclined roadways, provision is made for a truck stand serving the third story of the warehouse.

Stacy Street Terminal

The Stacy and Lander Street wharves and transit sheds are 90 feet wide and 750 feet long, with the roof carried on trusses spanning the full width so the floors are unobstructed by columns. A slip 212 feet by 800 feet separates the wharves. Two railroad tracks on the open wharf and four depressed tracks serve these wharves.

The Stacy Street warehouse, situated at the head of the above mentioned slip, is a modern, reinforced concrete fireproof building, four stories in height. Each floor has a storage capacity of about half an acre. Provision has been made for handling freight within the warehouse by the installation of three electric elevators, two spiral chutes, one electrical vertical conveyor and portable electric tractors and trailers.



Sectional angle furnaces and a portion of the slab-bending floor at the J. F. Duthie & Company plant.

Hanford Street Terminal

The Hanford Street wharf is located on East Waterway at Hanford Street. The transit shed is of timber construction, covered with corrugated galvanized iron. Floors are double plank construction. An asphalt driveway 20 feet wide extends down the center. The transit shed is fitted with an automatic sprinkler system throughout. The length of the transit shed is 1278 feet, and the width 90 feet. The second floor is 780 feet long and 90 feet wide. Both floors are lighted with continuous rows of windows five feet high on each side, and with 300 electric lamps for night work. Berthing space on the south side is 1000 feet, and on the west side is 479 feet, with water depth 35 feet at extreme low tide. This dock is well equipped with mechanical handling equipment, such as Brownhoist portable conveyors, gravity rolls, electric elevator, and inclined chutes for the economical handling of sacked grain and baled hay.

The Hanford Street grain elevator is a reinforced concrete building and consists of 55 circular bins of 16,000 bushels each, 46 interspace bins of 3600 bushels each, and 32 workhouse bins. The height of the storage bins is 90 feet, and height of workhouse, 165 feet,—the highest solid concrete grain elevator in the United States. The bulk receiving capacity per day of 24 hours is 95 cars, and the bulk shipping capacity per hour, 20,000 bushels. The machinery is of the most modern type, driven by electricity. The total capacity of the grain elevator is 1,050,000 bushels. Bulk grain is delivered by a conveyor from the elevator to a conveyor house on the roof of the Hanford Street transit shed, where it is spouted into vessels by means of two traveling cranes, and spouts anywhere along 780 feet of its length.

The Hanford Street hay shed is constructed at the extreme west end of the Hanford Street properties. It is equipped with two large hay balers. The largest of the two balers is capable of compressing one ton of hay into fifty-five cubic feet, and the total hay baling capacity is 80 tons per eight-hour day. The shed has a floor area of 4600 square feet and will accommodate twenty-five carloads of hay for storage, and since it joins the Hanford Street transit shed, the latter can be used for storage if found necessary. A vertical conveyor has also been installed to convey the hay for storage to the second floor of the Hanford Street dock.

Spokane Street Terminal

The Spokane Street fruit storage building is a seven-story concrete, fireproof building, 150 feet wide and 200 feet long, having a floor space of nearly 210,000 square feet. It is a strictly modern cold storage building, built for the storage of fruit, and has a net capacity of 20,000 tons. It is equipped with three high speed electric elevators, and is sprinkler protected. The building is completely insulated with cork board, and the insulation of the

outside walls is practically continuous. The building is operated on what is known as the forced air circulating system, the air being cooled and put in proper condition as regards moisture content in bunkers overhead in the corridors of each floor. The air then is forced through the bunkers and rooms by means of electrically actuated blowers, the air being conducted into the rooms in spruce air ducts, which are placed along the floor at the walls where possible, and taken out of the rooms by means of a similar duct on the ceiling near the center of the room. This system has proven to be most satisfactory for holding fruit and other commodities in cold storage. The humidity of the air in the rooms can be accurately governed, and any contamination in the outside air used can be removed by the application of the brine spray provided in the bunkers.

The fish and ice storage building is of timber construction, approximately 120 by 200 feet in plan, and insulated with granulated cork, which is retained in place and protected from moisture by two thicknesses of tongue and groove lumber and two thicknesses of waterproof building paper. The fish storage building is one story in height and contains four sharp freezers for the freezing of fish, six large rooms for the cold storage of fish, and a car pre-cooler for the cooling of refrigerating cars, and is capable of freezing 120,000 pounds of fish per day, and has a storage capacity of about 2,000,000 pounds of fish. Two electrically operated derricks, of five tons capacity each, have been installed adjacent to the fish freezers and storage to facilitate the unloading of fish from boats. Two electrically actuated elevator ice crushers, with necessary spouting and conveyors, having a capacity of 75 tons per hour, also have been installed for the icing of boats and the packing of fresh fish on the wharf. The ice cold storage building, approximately 35 by 100 feet in plan, and 50 feet high, has a capacity of 5000 tons of ice, and a temperature of twenty-eight degrees Fahrenheit can be maintained in this room. It is equipped with two automatic ice elevators, one of which elevates the ice as it is delivered from the ice tank in the compressor building, through a tunnel for piling in the ice storage room. The other elevator serves to deliver the ice from the storage room to car icing platforms or to inclined chutes on the roof of the fish storage building, which carries the ice by gravity to the ice crushers from where it may be distributed to vessels or to the fish packing rooms.

The compressor building is a one-story, reinforced concrete building, approximately 100 by 120 feet in plan, and contains the refrigerating units, which consist of three horizontal, double acting ammonia compressors, each having a capacity of 110 tons at 20 pounds of evaporated pressure and 175 pounds of condensing pressure at 70 r.p.m., also a single

(Continued on Page 133)

Tacoma's Place in Steel Shipbuilding



Launch of the "Masuda", and Miss Ethel Eves, sponsor.

THE Todd shipbuilding plant at Tacoma embraces a highly modern plant situated on a tract of 105 acres, and interest attaches to this yard for several reasons aside from the character of its equipment, as it forms a part of one of the largest shipbuilding and repair organizations in the country, and at the same time is an entirely independent plant, and again the plant was constructed and steel steamers built and launched in remarkably fast time, considering the condition of the shipbuilding site when taken over by the Todd interests.

The original site was a large expanse of mud flats, necessitating the construction of heavy retaining bulkheads and extensive and heavy fills. Actual work was started on March 9, 1917, when several dredgers began filling in the entire site, this fill averaging eighteen feet in depth. In this made ground, an immense amount of piling for foundations, not only for buildings and ways, but also for spur tracks and roadways, was necessary. This work was rapidly completed, however, and shops and building berths began to assume shape.

There are four parallel building ways constructed on one hundred foot centers, and planned to accommodate vessels up to 600 feet in length. Material over and about the ways is handled by means of overhead aerials, which are operated by electric winches placed on top of the crane shed, the opera-

tors having a full view of the destination and the path of travel of material being handled at all times. This method of material handling has found great favor among the shipyards of the Northwest, and is almost universally used. The present system of building ways and handling equipment at the Todd plant is being doubled at the present time, the four additional ways being well under way.

The present fabricating shop and punch shed is 320 feet long and 250 feet wide, including a 50-foot craneway on each side, these craneways being served by five-ton electric traveling cranes. In order to take care of the requirements of the four new building ways, four bays of the same construction are to be added, increasing the length of the building by 136 feet, the new addition to have the same width as the original building. This large shop is fitted with the latest and heaviest fabricating machinery, punches, shears, rolls, flanging machines, etc., and is efficiently served with powerful overhead cranes, as well as with individual crane service to the heavier tools. Above the fabricating shop and covering its entire area is the mould loft.

The main equipment in the power house consists of four Ingersoll-Rand compressors of a capacity of 2100 cubic feet of free air per minute each, and all motor driven. Orders have been placed for doubling the present compressed air capacity in or-



View in plate shop, showing large bending rolls.



Mr. C. W. Wiley, president Todd Dry Dock & Construction Corporation.



Mr. W. H. Todd, president Todd Shipyards Corporation.

James & Merrihew photo.



View in power house, showing two of the compressor units and the general switchboard.

der to take care of the needs of the four new ways and the new shops which are mentioned later in this article. The main switchboard and the transformers for power and light are located in the power house, the entire electric control being from the one station. High pressure fire pumps are also located here and connected with a complete system for the most efficient fire protection.

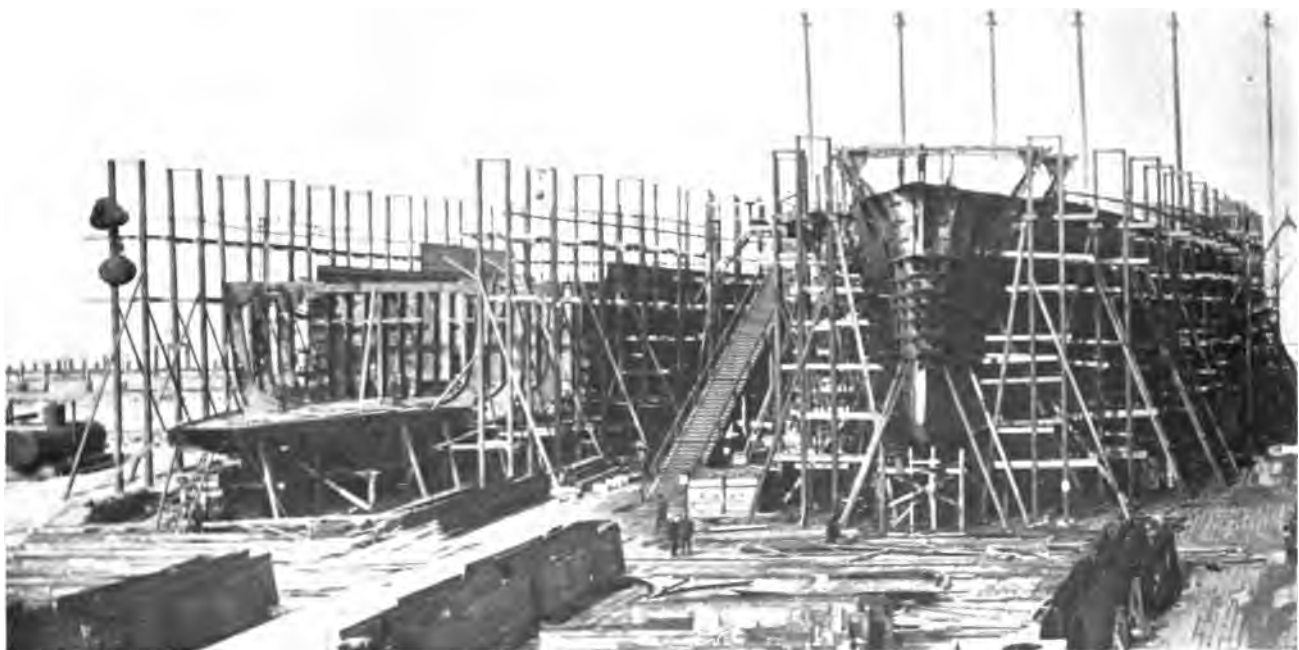
Material entering the yard is stowed in plate racks back of the fabricating shop and from there is picked up by overhead cranes, and is carried into the laying off shed adjacent to the fabricating shop. When the plates or shapes are marked for the work to be done upon them they go directly through the shop onto the assembling floor, thus avoiding extra handling after material has been punched or sheared. This shop has made some splendid records in tonnage of worked-up material.

The first vessel to be launched at the Todd plant

was christened the "Tacoma". She is a 7500-ton deadweight capacity freighter and was originally ordered by the Cunard Steamship Company, being commandeered by the United States Shipping Board and finished to the order of that body. Her launching date was March 28th, or just slightly over a year from the time that the dredger started in to fill in the tide flats which now comprise the Todd plant.

The second vessel to be launched, the "Masuda", was put overboard on May 23rd, and is of the same type as the "Tacoma", being 396 feet long, by 53 feet beam by 29 feet 3 inches moulded depth, and is powered with 2400 horsepower triple expansion engines, steam being furnished by three Scotch marine boilers. The "Masuda", a picture of whose launching is shown herewith, was christened by Miss Ethel N. Eves, the fourteen-year-old daughter of J. A. Eves, the general manager of the plant. This launching was a gala event, being attended by Mr. W. H. Todd and a party of guests from the East, as well as by officials of the shipyard, and other business executives who are prominent in Northwestern affairs.

When the Todd plant was planned for Tacoma, it was the original intention to construct engines and boilers for the vessels built here, at the plant of the Seattle Construction & Dry Dock Company, which has become a part of the Todd organization. The sale of the latter plant to the United States Shipping Board, however, necessitated a new arrangement, and the company immediately undertook a complete shop equipment at the Tacoma plant to take care of the needs of all vessels which might be built there. These improvements and additions now under way consist of a boiler shop 400 feet by 100 feet in dimensions, a blacksmith shop 250 feet by 100 feet, a modern iron and brass foundry build-



View of the four building ways now being utilized at the Todd shipbuilding plant at Tacoma.

ing 250 feet by 120 feet, a machinery storage warehouse 250 feet by 100 feet, a great machine shop 500 feet long by 120 feet wide, a store room of two floors 100 feet by 140 feet and a general office building 80 feet by 200 feet in dimensions, the upper floor of which will be utilized as a draughting room. This extensive shop system in conjunction with the eight building ways will make the Todd plant at Tacoma one of the most complete and up-to-date in the entire country.

In addition to the plant improvements and additions noted above, this company is erecting a hotel to accommodate some of its employees. This hotel will be in two units of three stories each, with a large restaurant in between. The restaurant is being planned to accommodate 1500 people, and besides serving the men staying at the hotel will serve luncheons to the other workmen. The hotel units themselves are each arranged to care for 300 men.

In addition to the shops and buildings for housing and feeding labor, there will be 850 feet of additional fitting-out wharf constructed, giving a total berthing space of about 2000 feet for outfitting purposes.

Another addition to the plant which is worthy of more than passing notice, is the splendid hospital now under construction. The hospital building is 60 feet by 40 feet in size, and contains ten beds, a sick diet kitchen, operating room, and is fitted with all the equipment necessary for prompt and efficient treatment of accident cases.

A rather unusual unit of the handling equipment is an electric traveling derrick car for handling weights up to 1000 pounds. This little traveler is independent, goes anywhere, and is operated by a storage battery.



Storage battery electric traveler with 1000-pound hoist at work.

The property at Tacoma is one of a group of plants forming the Todd Shipyards Corporation, whose recent remarkable expansion, both in the way of increasing the equipment of its old plants and building new establishments, has furnished one of the chapters in the recent history of America's return to the business of shipbuilding. The Todd Shipyards Corporation at the present time controls the Robins Dry Dock Company, The Tietjen & Lang Dry Dock Company, the Tebo Yacht Basin Company, the Quintard Iron Works, and the White Fuel Oil Engineering Corporation, all situated within the boundary of the city limits of New York, and some idea of the magnitude of their work may be estimated, when, by actual count, it has been found that they have round New York harbor as many as one hundred and fifty vessels under repair at one time and employ in the neighborhood of six or seven thousand men. When these



Four new ways are now under construction which will double the capacity of Tacoma's great shipbuilding concern.

busy plants are taken in conjunction with the corporation's Western yard, the Todd Dry Dock & Construction Corporation at Tacoma, Washington, it will readily be conceded that this concern is playing a highly important part both in the matter of new construction, and also in keeping the great merchant fleets of both the Atlantic and Pacific Coasts in good working order.

There is probably no dry dock or repair plant in America today, where there is being undertaken, and successfully too, so much that is unusual and out of the ordinary, in the way of repairs and conversion of ships, as at the Robins Dry Dock & Repair Company, Erie Basin, Brooklyn, N. Y. It is also one of the largest plants of its kind, not only in America, but in the world, its controlling genius being Mr. Wm. H. Todd, president of the Todd Shipyards Corporation.

Under Mr. Todd's skilful management, the business of the concern has advanced by leaps and bounds, necessitating vast enlargements and improvements, such as larger machine shops, blacksmith shops and boiler shops and the installation of many of the largest types of new and up-to-date tools.

The plant is equipped throughout for electric drive, which includes the running of all shop tools by individual motors, as well as the operation of the new centrifugal pump system which drains two of the large graving docks.



At work on the mould-loft floor of the Todd plant. This view gives an idea of the large size of the laying-off floor.

Plans have been prepared for increasing the size of one of the graving docks to a length of 100 feet, and at the same time giving it a depth of 32 feet of water over the sill. In all there are five dry docks connected with this plant, as follows:

No. 1.—Graving, 510 feet long, 115 feet wide, 26 feet deep.

No. 2.—Graving, 620 feet long, 11 feet wide, 30 feet deep.

No. 3.—Sectional, 370 feet long, 110 feet wide, 27 feet deep.

No. 4.—Sectional, 560 feet long, 127 feet wide, 17½ feet deep.

No. 5.—Sectional, 370 feet long, 101 feet wide, 12 feet deep.

The plant is provided with a complete industrial railway system, extending to all parts of the yard. All work, such as chipping, caulking, riveting, etc., is done by pneumatic tools, operated by a compressor plant of three large electrically driven Ingersoll-Rand air compressors. There is also a complete acetylene gas burning system.

The plant covers about thirty acres with a water-frontage of 3000 feet, exclusive of piers, and employs between 3500 and 4000 men at all times.

When in 1913 it looked as though we would have trouble with Mexico, the War Department turned over to this concern three large merchantmen to be converted into troop and animal transports. This conversion, which was almost a rebuild-



Laying out work for its journey through the plate shop, showing bridge cranes which shift the material in to the tools.



A steamer at the fitting-out dock, showing method of handling material about the yard and on to the vessel.

ing, was completed in every respect on all three ships in the unprecedented time of four days and nights, both army and navy officers marveling at the organization and capacity of the plant which could do a job of this sort in such a short period of time. It is but another indication of American ingenuity and ability to accomplish the unbelievable.

Colonel E. H. R. Green, son of the late Hetty Green, who recently purchased a Great Lake passenger steamer, brought the vessel way from the Lakes to the Robins Dry Dock & Repair Company yard for entire rebuilding; this included lengthening by forty feet and fitting up as a palatial steamer for his private use.

Lengthening ships, or as it has been termed, "ship surgery", has been developed to a fine science in this versatile yard. The following is a brief outline of a recent "operation". The S. S. "George E. Warren", a steel ship of 2306 tons, 246 feet long, 43.5 beam by 25.3 feet deep, arrived at the dry dock 11 a. m. one morning, and by 4 p. m. the following day was ready to receive her fifty-two feet of framing and plating, etc., the "operation" taking but twenty-nine hours for cutting and drawing the fore and aft sections, the entire pulling being accomplished in the incredibly short time of eleven minutes.

While this yard does not make a specialty of new work, it recently completed for Mr. Horace

Dodge, of Dodge Bros., automobile concern, one of the finest yachts now on the Great Lakes.

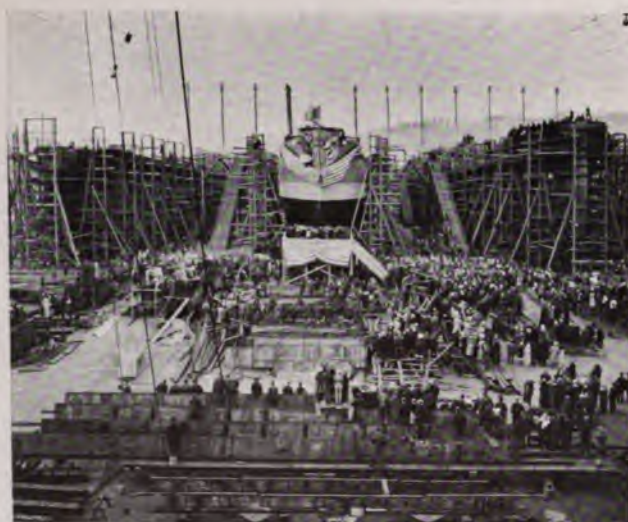
The yard is conveniently located for steamers entering the port of New York, has plenty of water at all stages of the tide, and is thoroughly equipped throughout for any and all classes of ship work.

The Tietjen & Lang Dry Dock Company is situated in Hoboken, New Jersey, in a cove off the Hudson River; the property consisting of twenty-three acres of land, docks and piers. The waters

of this cove are under the jurisdiction of the New York port authorities and the plant enjoys good rail connections with all the principle Eastern rail lines, as well as free literage within the limits of the harbor of New York. The plant is equipped with nine dry docks, all of the floating type, of which the largest is of 10,000 tons capacity. There are five piers with deep water alongside for vessels to lay at while outfitting or waiting their turn at the docks. The buildings at this plant are new and modern and consist of a plate shop for steel work, a well equipped machine shop for engine work and a complete saw mill and joiner shop take care of necessary replacements or changes where wood enters into the construction of the vessels being repaired. In addition to these there are two floating derricks, blacksmith shop, paint shops, store rooms and power plants. The compressed air equipment is very complete and includes three steam, one electric and one floating air com-



The large sectional floating drydock, a new structure which has been busily employed ever since it was finished.



General view of the building berths taken at the launch of the "Masuda".

pressor with a combined capacity of 5863 cubic feet of free air per minute. About three thousand hands are kept steadily employed at this plant, the work comprising Government, foreign and coastwise steamers, as well as local harbor and railroad work. A general view of the plant is shown herewith.

The Tebo Yacht Basin Company's establishment up to the middle of last year had been used exclusively for storing yachts during the winter and fitting them up in the spring and for general storage and winter quarters. Recognizing the urgent need for facilities and that all available equipment suitable for shipbuilding should be turned in that direction, the Todd Shipyards Corporation fitted this plant up as a small shipbuilding yard; putting down three shipbuilding ways, at present being occupied with Government mine sweepers, the engines for which are being built at the Quintard Iron Works plant of the corporation. Private yachts which have been turned over to the Government for patrol or mine sweeping purposes are also being prepared for their new duties at this plant. A new wharf and storehouse are under contemplation here, the new work to be designed with the special view to fitting out wooden hulls with machinery. Air compressors with a capacity of 2500 cubic feet of free air per minute have been installed, and at the present

time a force of over one thousand men find employment at this establishment.

One of the most interesting of the Todd plants is that of the Quintard Iron Works. This old and justly famous iron works was established in 1865, and has carried on a large, and from the engineering and scientific standpoint, highly important business ever since its establishment. The concern operates completely equipped shops, its forge shop being specially fine and has to its credit some splendid examples of both marine and stationary engineering. As an adjunct to its repair work, the Quintard Iron Works owns and operates two piers on East River. The works comprises boiler shops, machine shops and erecting shop, as well as a large forge shop, and is a complete engineering plant, as is evidenced by the many splendid marine jobs turned out in the long history of this famous New York plant.

The specialty of the White Fuel Oil Engineering Corporation branch of the Todd Shipyards Corporation business is fuel oil burning installations. This system is well known and widely used, especially on the East Coast, where it is considered to be fully equal to any of the present systems for burning fuel oil mechanically. The shops of this concern are situated in New York City and a large force is kept busy designing, building and installing the White system. At present the full capacity of the plant is nearly taken up with orders from the Shipping Board and Emergency Fleet Corporation.

It will be seen from the foregoing that the Todd Shipyards Corporation possesses in its various plants an exceedingly flexible group of concerns, and is well equipped for practically any kind of construction in the ship line, and has practically unlimited facilities for repair work. That this corporation is doing its full share in the great marine construction and reconstruction program now before the country goes without saying, and when the time comes when it is possible to tell the complete story of America's shipbuilding achievement during the war, it is certain that this combination of yards and repair plants will be accorded a high and honorable place among those concerns that worked hard and earnestly in the face of their country's need.



Panoram of the punch bay of the ship shed showing a battery of punches at work.

The Marine Pipe and Machine Works

THIS concern started in a small way in 1906 at the corner of Railroad Avenue South and King Street, Seattle, under the name of the Seattle Marine Pipe Shop, and engaged in steam-fitting, large pipe cutting and threading.

Three years later, owing to increased business, the firm moved to 579 Railroad Avenue South, adding more machinery and tools and entering into the general machine repair work. At the same time the company was incorporated under the name of Marine Pipe & Machine Works, and enjoyed a lucrative business from the start.

In the spring of the present year, owing to the rush of new work, they were compelled to seek still larger quarters, so purchased a tract of land, 160 by 180 feet in size, at the corner of West Spokane Street and East Marginal Way, and proceeded to erect thereon a building 100 by 150 feet in dimensions. This building is a model in construction. The designer, Mr. J. F. Swanberg, manager of the firm, realizing the advantage of



The new shop of the Marine Pipe & Machine Works at Seattle, known as the "Sunshine" shop of the Northwest.

the Pacific Coast".

In planning the building, Mr. Swanberg provided for a spur track running into the rear of the structure, where a twenty-ton overhead crane, which traverses the entire length of the shops, is utilized for loading and unloading freight. Some time ago the firm entered into the manufacture of the H. W. Sumner Company Marine Heavy Oil Engines, and an erecting stand has been provided at the rear of the plant with ample provision for the erection of six Sumner engine units at one time.



Interior of the Marine Pipe & Machine Works' new shop, showing a battery of large lathes.

efficient lighting in shop work, spared no expense in his design, and the result has been a wonderfully lighted shop that well deserves the phrase that is often applied to it—"the sunlight shop of

Among the special equipment secured for the new shop is a horizontal boring mill, 60 by 60 by 30 inches, with 4-inch spindle and platum 6 feet by 12 feet. A 52-inch Pittsburg compound gear heavy duty lathe; a 27-inch La Blonde lathe, two 20-inch American lathes, one 16-inch American lathe, and one crank-pin turning machine, the latter an invention of Mr. L. D. Crossett, the superintendent of the works. A Northern 20-ton electric crane has also been installed.

At the present time the Marine Pipe & Machine Works is working on seven sets of shafting for vessels building for the Shipping Board, and is running night and day, including Sundays. There



The main bay of the machine shop, showing engine bed plates and column castings in the foreground.

is also under way two 600 horsepower internal combustion engines for H. W. Sumner, and two 1200-horsepower steam engines for the Anderson Shipbuilding Company, the latter contract including shafting, propellers and condensers. Patterson & MacDonald and Meacham & Babcock are also having a large amount of engine work done at this plant and overhaul work on some of the vessels taken over into Government service has helped to keep a large number of mechan-



One of the side bays devoted to small machine tools, filing and bench work. Note the fine lighting effect.



One of the big lathes at work turning line shafting. A large amount of heavy machine work is turned out here for the shipyards.

ics busy night and day at this plant.

The management of the Marine Pipe & Machine Works is progressive and efficient and did not hesitate to strike out boldly when the country's need called for expansion in all the existing engine building plants. In erecting a new building and securing new shop equipment, the one aim was to secure the best, and the result has been a shop that is a credit to the entire Northwest.

Mr. W. A. Chapman, assistant manager of the Western Department at Chicago, paid the head office of the Fireman's Fund Insurance Company a visit during the latter part of June.

Assistant Secretary H. P. Blanchard of the Fireman's Fund Insurance Company has just returned from his semi-annual visit to the Northwest, where he was formerly special agent before his appointment as assistant secretary.

Completion of the Newest Yard

SEATTLE North Pacific Shipbuilding Company is the new name taken by the Erickson Engineering Company when Mr. C. J. Erickson joined forces with the Twohy Brothers of Portland, Oregon, the resulting personnel of the shipbuilding company being an exceedingly strong and capable one, whether viewed from the mechanical or financial viewpoint.

The plant of the Seattle North Pacific Shipbuilding Company is located on some 31 acres along the West Waterway, Seattle. The principal building is the punch shop, which is 160 by 370 feet in dimensions. The layout shop, 50 by 450 feet in extent is served by two bridge cranes. Plate storage is taken care of back of these buildings by three stiff leg derricks, each having an 80-foot beam swinging a complete circle, and thus covering a large amount of storage space. The punch shop is fitted out with batteries of the most modern punches, shears and rolls, all with independent electric drives. The angle shop is located in the south bay of the punch shop and the next bay contains a battery of modern oil fired angle furnaces and a large extent of bending slab. In connection with the punch shed, each bay is served by a bridge crane and the entire shop has been designed with a view to speeding up production to the last notch.

The punching machines are all served by Lysholm spacing tables, an arrangement which enables one man to do the work of four on an ordinary punch without mechanical aids for feeding the work. The assembling tables are served by overhead bridge cranes which run the entire length of the punch shop and are carried out beyond the end of the building for a hundred feet.

The mould loft is a two-story building covering 80 feet by 336 feet and situated just north of No. 1 way. This loft is extremely well lighted and has been pronounced one of the best lay-out floors in the Northwest. The ground floor of this building is utilized as a pattern shop, joiner shop, electrical shop and also contains offices for yard superintendents and Government or private inspectors. The tool equipment in the pattern and joiner shops has been very carefully chosen and gives the plant a splendid wood-working department.

There are five building ways at Seattle's latest shipbuilding plant, each 470 feet in length by 80 feet in width. In handling material over and about the ways the aerial trolley system is used, this method of handling having become practically the standard in the Pacific Northwest.

The general office is a modern building 54 feet by 108 feet in size and two stories in height. The



Mr. J. E. Sheedy, general manager Seattle North Pacific Shipbuilding Company.

lower floor is devoted to timekeeping, accounting and executive offices, while the upper is given over to the draughting room and blue print making establishment. The blue print room is fitted with the most modern printing, developing and drying machinery. In connection with the office, a two-story fireproof safe takes care of the office books and accounts on the lower floor and serves as a tracing file for the draughting room.

In the matter of providing safeguards of every kind for those employed about the plant, the management of the Seattle North Pacific Shipbuilding Company has been exceedingly thorough and has not limited itself merely to the requirements of state laws or the suggestions of liability insurance officers. Among other welfare features, a modern hospital has been erected with dispensary, operating room and a well equipped ward. Trained nurses are in attendance here night and day.

Due to the location of the plant being a little ways out from the built-up sections of Seattle, it was deemed advisable to take care of the eating requirements of the employees as far as possible. With this end in view, a splendidly equipped kitchen and dining room unit was planned and built. This consists of two dining halls, 40 by 110 feet in size, with a large kitchen unit between them. This part



Placing the first keel plate in position at the plant of the Seattle North Pacific Shipbuilding Company.



Mr. C. J. Erickson, president of the Seattle North Pacific Shipbuilding Company, driving the first rivet.

of the yard equipment is one of which the management has every reason to feel proud and which they are always glad to show visitors.

The housing of equipment intended for future use and of materials which must be kept away from the weather is taken care of at the north end of the plant by a storeroom 60 by 140 feet in size, and a warehouse 60 by 235 feet in dimensions.

The pipe shop, copper shop and sheet metal shop are all located at the north end of the works adjacent to the fitting-out wharf. This wharf is located north of No. 1 ways, and has sufficient berthing space for two large steamers. The fitting-out wharf will be fitted with a 75-ton shear legs derrick.

The power house is located at the south end of the steel or punch shed, and is a building 40 by 150 feet in size. Here will be found a battery of modern air compressors and provisions for the expansion of this branch of the power service to an ultimate capacity of 15,000 cubic feet of free air per minute. Here also are located transformers and switchboard control for the different voltage systems used throughout the yard. High pressure fire pumps form another part of the power house equipment and feed a high pressure system which furnishes ample fire protection to every section of the property.

South of No. 5 building ways is a building 40 by 240 feet in dimensions, containing the steel construction tool room, rigging and shipwright department and stores and a large number of wash rooms, locker rooms and toilet facilities. In the matter of lockers and wash rooms, a great number of these are scattered about the establishment, par-

ticular care having been taken that the men would feel no lack of these aids to their comfort.

The machine shop is 80 feet by 400 feet in size, and is modern in every sense of the term, being fitted with a very high class of equipment, including special machines for turbine work.

The personnel of the management of the Seattle North Pacific Shipbuilding Company, formerly the Erickson Engineering Company, Inc., is as follows: Judge John Twohy, chairman of the board; C. J. Erickson, president; J. E. Sheedy, general manager; J. F. Twohy, secretary and treasurer; A. E. Woodruff, assistant general manager; Arthur McDougall, naval architect, and B. O. Brown, chief engineer.

The concern has been very fortunate in securing the services of Mr. Sheedy just when construction operations have commenced, as his experience has peculiarly fitted him to this class of work. Mr. Sheedy was manager for the Inter-Island Steam Navigation Company at Honolulu for several years, his work for this company including the designing and erection of modern powered coaling barges and other marine work of an important nature, aside from caring for the repairs and upkeep of the company's fleet of steamers. Later Mr. Sheedy came to Seattle as assistant to the president at the Seattle Construction & Dry Dock Company, a post which he left but recently to accept a place in the Erickson organization.

Those who have been watching steel shipbuilding progress in the Northwest closely and critically predict a splendid building record for the new yard.

Seattle's Big Radio Factory

AN inspection of the plant of the Kilbourne & Clark Manufacturing Company, the big Pacific Coast producers of radio equipment,

brings to light many points of interest to manufacturing and shipping men.

The initial manufacture is begun in the stock room where individual parts are roughed out ready to be turned over to the machinist and brought down to exact size. After the finishing required they are turned over to the polishing department to be polished, plated, and all metal parts lacquered to prevent corrosion by the salt atmosphere, to which they will be exposed. As the parts themselves are completed they are turned over to the finished parts stock room, and when required for



Assembly room at the Kilbourne & Clark Manufacturing Company's plant, showing winding department in the foreground



View looking through the machine shop at the Kilbourne & Clark factory, showing a battery of the smaller tools.

enters as raw material and is automatically passed through each department in turn, ending at the shipping department as a completed product. Departments are so arranged that handling of the apparatus is reduced to a minimum.

With regard to testing. For example, a 2 K. W. complete equipment is operated at approximately 100 per cent overload for a number of hours. The severe test means the elimination of all troubles at sea after installation.

the assembly of given apparatus they are issued to the assembling department. After completion by the assembling department, the apparatus is turned over to the testing laboratory, where it is given tests approximately twice as rigid as would be required in actual service.

The factory covers a floor space of 42,240 square feet, and is conveniently arranged on two floors. The work is so routed through the plant that it



Girl mechanics at work finishing small parts at the Kilbourne & Clark shops.



In the toolmaking department. This is always one of the important departments of the well conducted and modern shop.

The greatest possible care must be taken in machining, and in the care of certain essential parts an accuracy within one ten-thousandths of an inch must be maintained. A corps of inspectors insures the maintenance of this accuracy before the parts are accepted for the finished parts stock room. The result of this careful manufacture is reflected in the highly successful operation of the equipment.

Approximately one hundred young women are

successfully employed in many positions heretofore held by men. In the employment of women on the heavier machine tools, it has been only found necessary for the skilled machinist to set up the tools, as women are fully capable of performing the requisite operation after the machine has been adjusted.

A force of fifteen to twenty toolmakers is continuously maintained in providing punches, jigs and tools for various machines. A great deal of the work requires so high a degree of accuracy that many precision instruments, including several manufacturing jeweler's lathes, are necessary.

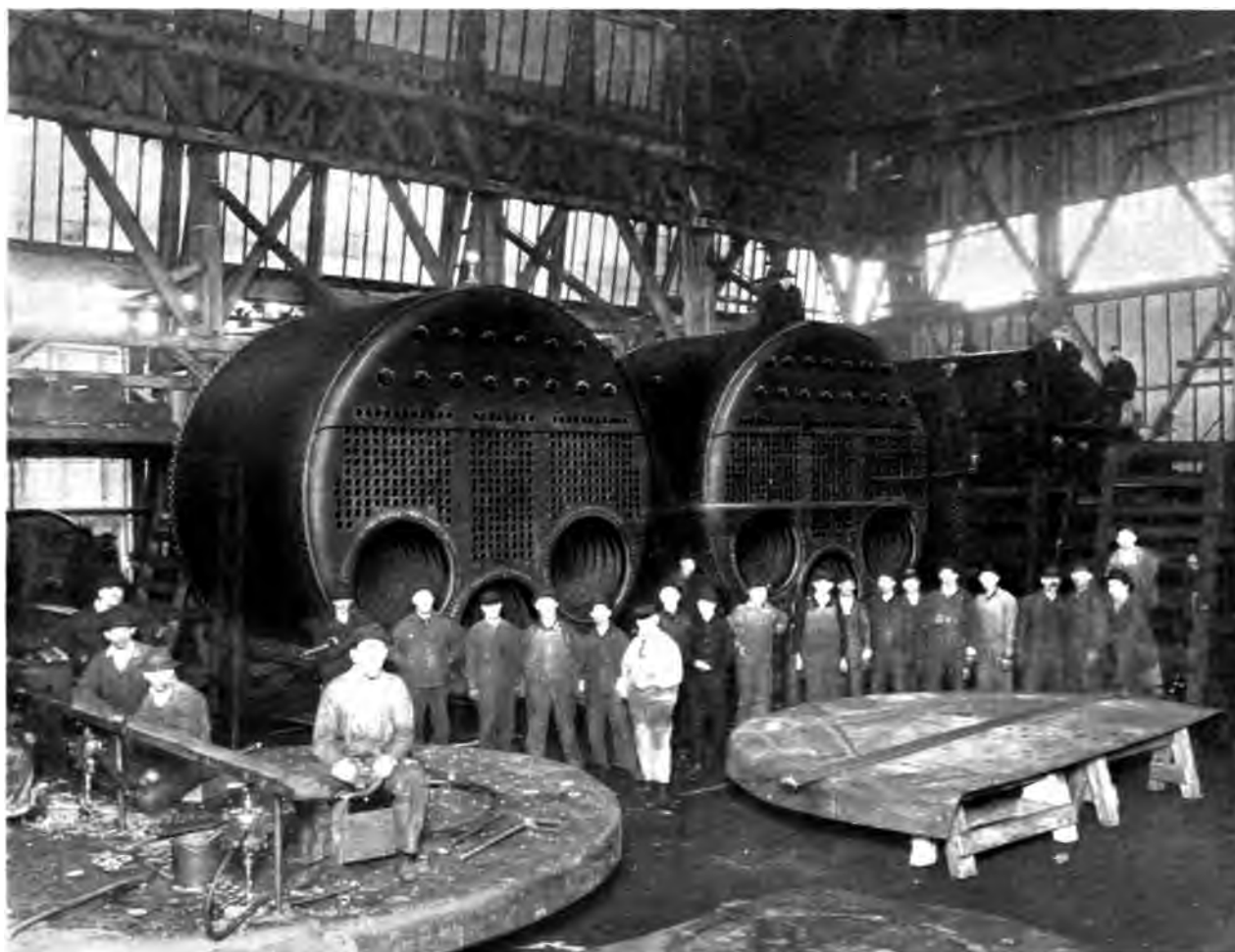
Approximately four hundred employees make available an output of ten to twelve complete sets per day.

One of the most important functions of the Kilbourne & Clark Manufacturing Company is the service which it supplies to ship owners, through the medium of the Ship Owners Radio Service, Inc., the latter company relieving the owners of the equipment of all details of operation, including maintenance, auditing of accounts, furnishing of operators, and the dissemination of radio information. The Service Company publishes monthly the Ship Owners Radio Bulletin with the object of keeping the shipping men in touch with radio operation, new legislation and existing regulations. A

novel feature of the bulletin is that it is in no way intended to serve as an advertising medium, but contains only information of general value to all users of radio equipment regardless of the manufacture of the apparatus used.

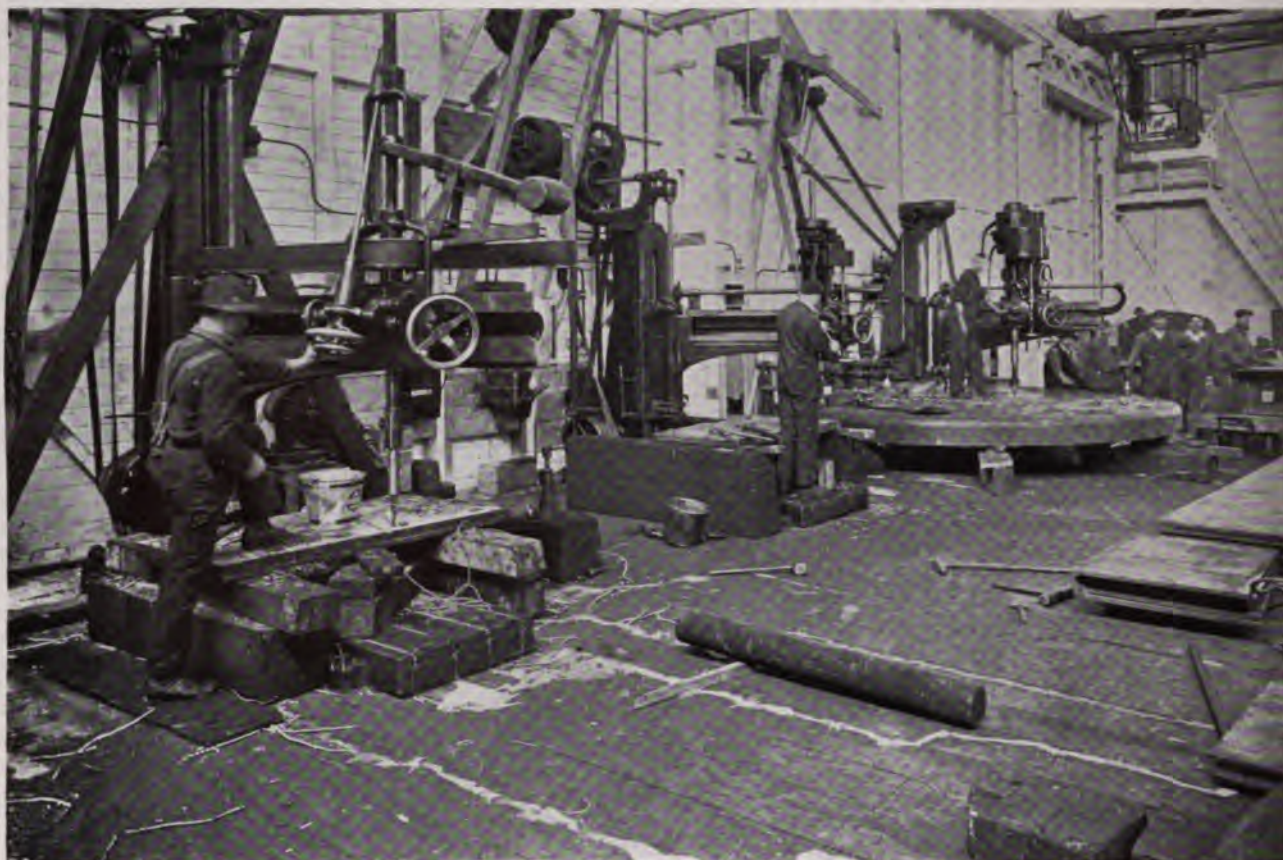
The company has manufactured large amounts of equipment for the United States Navy Department and for vessels of the Emergency Fleet Corporation, in addition to supplying the commercial needs of the rapidly growing American merchant marine. Prior to the beginning of the war the company was manufacturing and shipping radio equipment to all parts of the world, including England, the Scandinavian countries, Australia, Canada and the Orient. Branches are at present maintained in New York City and San Francisco, in addition to the Seattle factory.

The factory site now occupied has recently been acquired of the company by the Skinner & Eddy Corporation to permit the enlargement of the latter's yards, and it is rumored that the new location, not yet made public, of the Kilbourne & Clark Manufacturing Company, is a five-acre tract on the East Waterway, on which will be erected several factory buildings of the most modern type, which will permit the company to greatly enlarge its capacity.



A group of the "boys" at the Commercial Boiler Works, Seattle, waiting for the signal to do their bit.

Some Scenes in the Commercial Boiler Works



One of the drilling bays, showing radial drills at work.



Shifting a plate into the hydraulic plate-bending machine.



The Seattle home of the Rothweiler rivet sets.

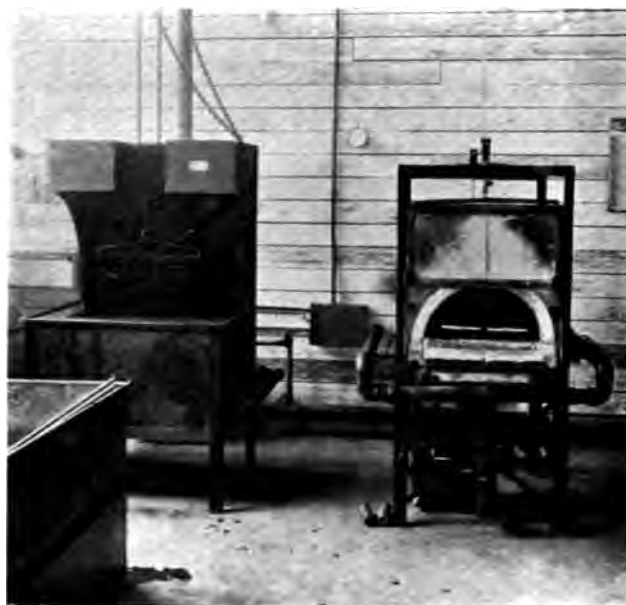
MODERN HOME OF ROTHWEILER RIVET SETS

IT is with the riveter that a great portion of the responsibility in speeding up the ship-building program lies. Work may be laid off in the mould loft, plates and channels may be shaped and punched in the ship sheds, but the riveter is the factor governing the speed with which this material shall be built into the hulls of vessels for Uncle Sam.

Since the riveter is of so much importance in modern shipyards, those who are engaged in making the tools wherewith he works hold an equal claim on the public's attention, and some photographs are shown herewith depicting the factory at which the Rothweiler Rivet Sets are manufactured.

This factory is located at First Avenue South and Hanford Street, Seattle, and has direct railroad spur track facilities at the rear of the building. The factory building itself is of the modern type where the matter of efficient lighting is given paramount importance in the design. The building is

of heavy mill and concrete construction, with an exceedingly high percentage of the wall surface given over to glass.



Furnace in the Rothweiler plant for heat-treating and tempering Metals.



A group of automatic machines on one side of the Rothweiler plant.

The Ames Shipyard is Answering

THE erection of the shipways and buildings comprising the Ames Shipbuilding & Drydock Company's plant at Seattle, may be looked upon as an achievement even in the Northwest, where shipyard construction records have been plentiful. Work on this large plant was started on December 1, 1916, the site then being a vacant sand fill. By the middle of March, three and one-half months later, many of the shops had not only been built and equipped, but three of the four building ways had been installed and the keels of two 8800-ton deadweight steamers laid. Despite the rapidity of this work, the construction employed was heavy and substantial, and the grouping of the shops and the building ways was carefully worked out with a view to co-ordinating the entire yard and securing the utmost efficiency which could be obtained for a shipyard of the size and character proposed.

Differing from some of the yards which are specializing on hulls only, the Ames Shipbuilding & Drydock Company are shipbuilders in the fullest sense of the term, both boilers and engines for the vessels under contract being built at the yard, as well as the hulls themselves. This necessitated an extensive shop equipment, so we find a large machine shop, blacksmith shop and boiler shop, in

addition to the usual outlay of plate shop, pattern shop, joiner shop, carpenter shop, electric repair shop, coppersmith shop, pipe shop, etc. There is also a large power house, boiler house, office, gate house, various buildings for the use of the workmen, etc. As might be expected in this ultra-modern yard, the outfit of machine tools of all capacities includes the very latest ideas of the leading tool-makers of this and other countries.

The handling of material at the plant of the Ames Shipbuilding & Drydock Company follows to a certain extent the usual shipyard practice of the Northwest. The trolley system is used over the ways, the shops are fitted with overhead electric traveling cranes with the usual individual jib crane service to the heavier tools, while a complete system of broad gauge tracks with locomotive cranes and cars solve the problem of handling miscellaneous material around the yard between the shops.

In the matter of looking out for the personal welfare of the employee nothing has been left undone. A splendidly equipped hospital has been erected inside the works and a doctor and a trained nurse are always at hand. Accident prevention has also received a great deal of careful attention, and every well proven preventive measure has been introduced both in working rules and in the safeguarding of



A general view of the Ames Shipbuilding & Dry Dock Company's Seattle plant.

the Nation's Call for More Ships

gears, hoists and all moving parts of machinery.

Another feature which illustrates the desire of the management of the Ames plant to make the surrounding of their workmen as conducive to comfort and good feeling as possible, is the well appointed dining room service, the restaurant room being 55 by 120 feet in size.

The yard is well situated from the accessibility viewpoint, being reached from the main residential districts of Seattle and surrounding communities by either trolley, steam road or ferry service.

The Ames Shipbuilding & Drydock Company's plant covers an area of about twenty acres, having a waterfrontage with ample depth alongside of 1200 feet and a somewhat irregular depth of about 850 feet. One of the principal buildings is the machine shop, which covers an area 110 feet by 450 feet in extent. This shop is served by one forty-ton and one twenty-ton overhead electric traveling crane, and is equipped with tools capable of handling practically any class of machine work. Worthy of mention among the larger machine tools are a 110-inch, double-end lathe with a sixty-six-foot bed, a sixteen-foot boring mill and a fourteen-foot planer. The entire equipment of the shop has been based upon the necessity of turning out one 3000 horsepower, triple expansion steam engine per month, as the Ames plant has been calculated throughout on

the basis of the delivery of twelve large steamers per annum.

The boiler shop has an area of 100 by 100 feet, and is well fitted with heavy tools for handling plate up to one and five-eighths inches in thickness. In addition to the service of a forty-ton overhead traveling crane, this shop has a separate twenty-five ton crane serving the large hydraulic bull riveter. The rated capacity of the boiler shop is three large Scotch marine boilers, or the steam generating plant of one of the 8800-ton deadweight freighters which the yard is building, per month. The blacksmith shop is the same size as the boiler shop, being 100 by 100 feet, and among other tools is equipped with a battery of seven steam hammers, the largest being a 5000-pound and the smallest a 250-pound hammer.

The plate shed covers an area of 90 by 450 feet, and is equipped with the regular assortment of punches, shears, rolls, etc., notable among the latter class of tools in this shop being a set of thirty-foot Hilles & Jones plate bending rolls. Many of the tools in this building, such as beveling machines, countersinking machines, scarphing machines and others, have been designed and built at the plant, and some of these machines are of considerable interest and show great ingenuity on the part of their designers. One attractive machine in use in



This view gives a good idea of the general layout of shops and building berths.



Machining the flange of a big propeller blade.

the plate shed is a portable electric countersinking machine. This machine was pictured at work in the May, 1917, issue of the "Pacific Marine Review". There is tool capacity in the punch and bending shed to take care of the working up of sixty tons of material every eight hours.

The pattern shop, joiner shop and pipe shop occupy the lower floor of a building 90 by 360 feet in



View in the main bay of the machine shop, showing engines being erected in the foreground.

size. These shops are all fitted with the latest woodworking and pipehandling machinery, and although the yard's contracts are all for freighters, as much care has been taken in furnishing the joiner shop as if passenger vessels were to be built. Over these shops and occupying the entire upper story of the building, is a well lighted mould loft with a splendid, clear floor, 90 by 360 feet in extent.

The power house is a substantial structure, and here is centered the power control for the plant. There are seven Ingersoll-Rand air compressors, all electrically driven and furnishing an ample supply of compressed air throughout the shops and shipyard. Here is also located the main electrical switchboard, serving as a central power control station, and the transformers for the different power currents required throughout the plant. High pressure centrifugal pumps for fire service are also located in the power house always ready to pump high pressure water through the extensive fire



The steamer "Westwood", a product of the Ames Shipbuilding & Dry Dock Company.

main system, which covers the entire yard and reduces the fire risk to a minimum.

The plate storage yard is adjacent to the plate shop, and is thoroughly covered by cranes which handle the material directly into the plate shed, where it is fabricated, there being no lost motion during the transaction or at any time during the progress of the steel from the plate racks to its place in the hull structure of a ship. The racks provide a hull steel storage capacity of 9000 tons. Miscellaneous handling about the yard is taken care of by three powerful locomotive cranes which operate on an extensive track system which covers not only the yard itself, but also the shops and fitting-out dock.

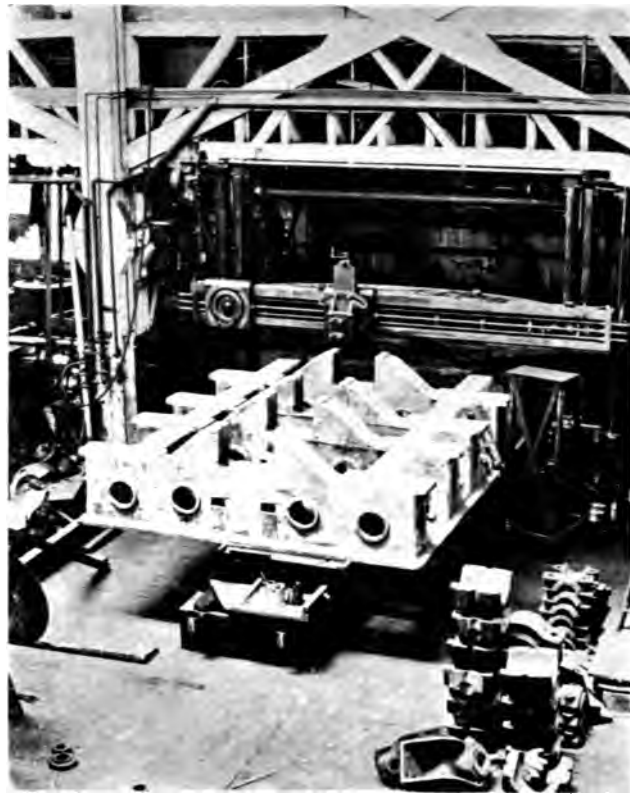
The general office building is conveniently and centrally located and contains the accounting and timekeeping departments and executive offices on the ground floor and a well lighted draughting room overhead where some fifty draughtsmen are employed at all times.

The building ways are four in number, being 450 feet in length and 58 feet wide, all thoroughly piled and furnishing a very rigid foundation for the building of ships. Material is handled by double aerials over each set of ways. The poles on which the trolley cables are carried are 105 feet high, and the winch station from which the handling for each building berth is carried on is high above the work, giving the winchman a clear view of the passage and destination of his load at all times. The hoists, which are of fourteen tons capacity, are operated either separately or in unison, giving a wide range in handling of heavy weights.

As the waterway on which the Ames Shipbuilding & Drydock Company's plant is located is somewhat narrow, precaution has been taken to provide suitable brakes to check the speed of a vessel during her passage down and after she has left the ways. For this purpose five-ton concrete blocks, from six to eight in number, are taken up by the moving vessel, these strains have been found sufficient to check the headway of one of the big freighters all that is necessary.

Once launched, the vessel passes to the fitting-out dock, which has been arranged to accommodate two large steamers at once. On this dock there has been installed an electrically operated set of shear legs of 100 tons capacity, while the coppersmith shop, sheet metal shop, rigging loft, electrical repair shop and pipefitters' shop are all located immediately adjacent to the outfitting wharf, thus making conditions ideal for the speedy outfitting of vessels.

At the present time the Ames Shipbuilding & Drydock Company employs over 5000 men, and has just reached its stride in production. The plant is engaged in the building of a large number of 8800-



Machining a large bed plate in the machine shop of the Ames plant.

ton deadweight freighters for the United States Shipping Board, and is turning over its share of ships, all of which have borne testimony to careful designing and high class workmanship.

Mr. W. P. Cassell, special agent of the Home Fire & Marine, with headquarters at 264 Colman Building, Seattle, is paying a short business visit to the head office in the Insurance Exchange Building, San Francisco.



In the boiler shop of the Ames plant. Note the continuous crane service, the cranes traversing both the machine shop and the boiler shop.



Panorama of the Meacham & Babcock Shipbuilding Company, on Salmon Bay, Seattle.

A Wooden Yard With a Purpose

WORK on the present site of the Meacham & Babcock Shipbuilding Company was started on June 6, 1917, the location being on Salmon Bay, near Ballard, and the condition of the site being that of a marsh filled with backwater pools. After a month of dredging and filling, the first foundation pile was driven on July 4th, so that actual construction of the plant started just one year ago.

The site consists of twenty-two and one-half acres, and its exact location is at Fifteenth Avenue, West and Emerson Streets, Salmon Bay, being located on Seattle's inner fresh water harbor. Six building ways have been installed, and on these are six Ferris type wooden steamers in varying stages of completion. The firm holds a contract for ten of these vessels, and such satisfactory progress has been made that there is little doubt of their receiving as much more work as they care to handle.

The shipbuilding site has been leased from the City of Seattle for a period of seventeen years, and improvements have gone steadily forward from the time of the driving of the first foundation pile. A new blacksmith shop and a new finishing building have only recently been installed, also a shear legs and derrick of fifty tons capacity, it being the intention to fit the ships out complete at the yard.

A very complete system of broad gauge tracks has been installed throughout the property, it being possible to reach every part of the yard and connect with all the overhead handling equipment by freight cars or hand-car trucks.

Building ways are served by big traveling derrick cranes. There are three of these traveling

on wide spaced tracks, one being located between each pair of ways, and traveling the full length of the hulls. As these derricks are fitted with seventy-four-foot booms, it is possible to utilize two of the derricks on one hull at the same time if so desired.

A great deal of attention has been paid to labor-saving devices at the Meacham & Babcock yard, and there is little doubt of the company living up to its proclaimed program of a ship a month. Perhaps the most interesting feature of the yard in this respect, and certainly one that is unique, is their underground waterway for handling ship timbers. From the company's water storage area on Salmon Bay, a canal was constructed leading to the mill supply pond alongside the mill in the shipyard itself. This canal is entirely planked over and is, of course, smooth-sided and without bends. The Meacham & Babcock yard is located about one mile above the Lake Washington canal locks, leading to the Sound, and is on fresh water, and is about eighteen feet above the water level of the Sound. Located just to the rear of the yard is a six-foot municipal sewer which is also at a considerable lower level than the Salmon Bay water. Permission was obtained from the city to connect the canal up with a large gate valve to this sewer, and when it is wished to transport a piece of timber from the log storage to the mill pond, the valve is opened, and the resulting flow drifts any log or timber that is started along the canal into the mill pond.

The first of the Meacham & Babcock ships, the "Boulton" was launched on May 18th, Miss Jessie Monk, the little daughter of George Monk, superintendent of ship construction, officiating as spon-



The six building ways of this firm, all occupied by a large wooden hull, forming an imposing picture.

sor. The "Boulton" was Monk's one hundred and first ship.

The "Boulton", like the other nine vessels which are to follow her, is a Ferris type ship of 3500 tons deadweight capacity, and is 281 feet 6 inches over all, 46 feet moulded beam, and 26 feet moulded depth. She is being equipped with a 1400 horsepower triple expansion engine which will give her a load speed of ten knots. The keel was laid for this vessel on October 10th.

It is understood that no other vessels of the Ferris type will be built by Meacham & Babcock when those now on the ways are launched, but that 4700-ton deadweight ships of either the Dougherty or Ballin type will be constructed.

The executive organization of the Meacham & Babcock Shipbuilding Company is as follows: W. H. Meacham, president; Otto A. Case, vice-president; L. E. Meacham, secretary, and H. G. Babcock, treasurer.

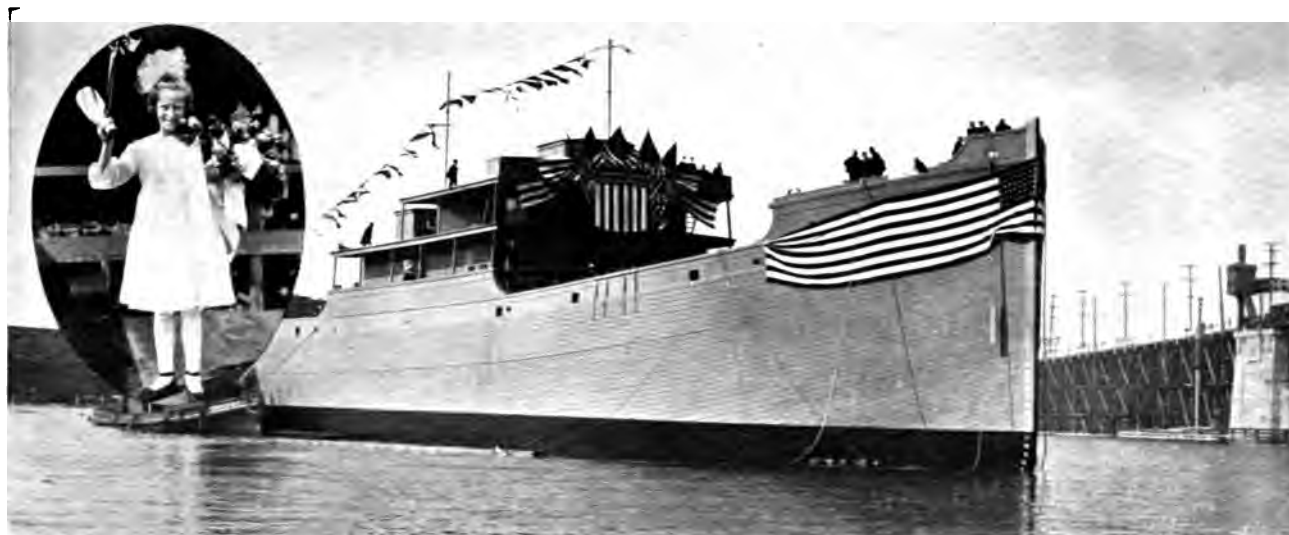
PERSONAL MENTION

The China Mail Steamship Company moved into its spacious new quarters at Sacramento and Montgomery Streets on July 1st.

The "Santa Flavia", W. R. Grace & Company's latest motorship, held a successful trial trip on the bay during the latter part of the month. The "Santa Flavia" is fitted with twin 320 horsepower Bolinder engines.

The Robert Dollar Steamship Company has chartered the new motorship "Alabama", the auxiliary powered schooner "Bowles" and the steamer "Oakwood", the three vessels aggregating 9600 deadweight tons capacity.

After a recent conference with the United States Fuel Administrator and the United States Fuel Company at Salt Lake City, Mr. James B. Smith, president of the King Coal Company, has stated that there need be no anxiety over bunker fuels at San Francisco this year.



The steamer "Boulton", Seattle's first contribution to the United States wooden fleet, and Miss Jessie Monk, daughter of Plant Superintendent George Monk, who acted as sponsor.



View of the mill pond, showing entrance of the covered canal which connects with the Meacham & Babcock's Salmon bay lumber storage.



Logs are floated into this pool, in the heart of the shipyard, thus saving the cost of handling heavy logs by truck or cranes.

When the War Ends

By John Clausen, Vice-President The Crocker National Bank of San Francisco

WHETHER the end of the war is near or far, not the least among the many evils of a prolonged international struggle must be considered the artificial world-wide conditions which such a state of affairs brings about. The usual relationships of commerce have been disrupted and altered to the extent that new means for carrying on any form of international trading have become a daily issue and of constant necessity.

The test, in so far as it has served to rouse American public opinion in international affairs and to an understanding of commercial interdependence of nations, has been of especial benefit to the United States. While there may be too much optimism as regards our opportunities, there will doubtless be a change in our commercial and financial position when the present world-wide strife comes to a close. It may be safe to predict that the volume and direction of our trade will be different. The ability of European nations to furnish capital to develop other countries will, in all probability, be lessened, perhaps for a period of many years to come. South and Central America, China, and Mexico may turn to us more than ever before in the purchase of goods and for their financial needs.

It resolves itself into a complex and practical awakening for a scientific development of the trading and investing powers of our country. Mutual co-operation and study, therefore, of our ability to meet and solve the numerous new problems which are presented to the American people seem both timely and worth while.

America's Opportunity for International Trade

The international commerce of the United States in the past has not been far different from that of any new country which had great natural resources and was sparsely populated. There was more to be made by developing our own resources and domestic trade than in producing manufactures for export in competition with the cheap labor of older countries. As time went on and our population grew, we became the greatest consuming nation in the world. Our manufacturing interests rose to more importance until in many lines we lead all rivals, not only in volume of product, but in economical production, because of so varied and abundant a supply of raw materials, which made it possible to organize production upon a great scale.

The automobile business affords a familiar illustration. The wages paid in the automobile factories are very high, and far beyond the pay to mechanics for similar work in other countries, but owing to the scale upon which the automobile in-

dustry is organized, the cost of production have been lower here than abroad, with the result that our manufacturers have actually lead the world in low-priced cars. The advantages of mass production are now well understood, and our home markets are given a strong position in this respect. Wages are higher, in the United States than in most countries, and probably will remain so, but coupled with high organized capital and equipped with most modern appliances of production, the labor factor may be low—notwithstanding high wages.

The United States is now the richest, most highly equipped and most productive country in the world. Under the pressure now laid upon our industries their capacity is being expanded rapidly and their efficiency increased by the adoption of every possible labor-saving method and device. Our pre-eminent position in the manufacture of steel is shown by the fact that our output is now approximately four times that of Great Britain, and probably equal to that of all the rest of the world put together. In the making of machinery, we have a similar position of leadership.

When the war is over we cannot, however, expect to employ all this capacity in simply supplying our home markets. In order to keep these works busy and the wage-earners employed, we must find markets abroad, and there is every reason to believe that other countries will be in great need of all the things with which we are bountifully blessed. In the years to come there will literally be no end to the needs of the world for steel, machinery and many other products which we will be wanting to sell. But this demand for goods will undoubtedly be accompanied by frequent requests for credit and by appeals for the people of this country to take their pay for these products of our factories in securities, which will virtually represent an interest—either as lenders or proprietors—in foreign enterprises.

Capital Demand and Credit After the War

It may not be possible for other countries to buy of us and make payments in gold, nor will we want them to send us large shipments of goods of a class which will interfere with our own industries. The only way, therefore, that we will be able to make the export sales hoped for will be by using our capital to finance the purchases.

While this will be a new policy for us to adopt, it is that by which Great Britain has made herself pre-eminent in foreign trade, and brought Germany in the field as the chief rival of that nation for commercial supremacy. This is the natural course

of action for any country when its internal development has gone so far that there is greater profit in aiding the development of other nations than in expending all of its accumulating capital at home. This is now the situation of the United States.

At the end of the war we will be a creditor nation, with a large balance due us annually on interest account. The natural policy for a country thus situated is to invest the income abroad, and if the investments are directed into industrial enterprises they may serve to promote advantageous trade relations and to enlarge the outlet for American goods.

In wealth, our superiority is undeniably great, but it is not yet certain to what extent this wealth will be available to support our international trade and other activities. In England there is found a large body of investors accustomed to buy the securities of enterprises in all parts of the world. A similar body, although less numerous, has been developed in Germany, France, Holland and Belgium. The question with us is whether we will know how to use our new position in world affairs, and our new wealth in such manner as to internationally strengthen ourselves and develop such a constituency behind our industry.

Our people have not been generally accustomed to make investments at a distance. With all parts of the country rapidly developing, their natural tendency has been to invest in land and local enterprises. Such investments have served the country best in the period of its early development, but as the country grows older and richer there is danger that the preference for land investments may carry prices of the soil above conservative values, and it is desirable that new channels for the disposition of the country's accumulating capital be opened up. The distribution of the Liberty Loan has shown that there is enormous buying power in the country for securities that have the confidence of the public, and which are energetically brought to their attention, particularly if a patriotic purpose is to be served. It is of the highest importance to familiarize our people with the fact that after the war is financed, the next important task for this country will be that of financing the rehabilitation of industry throughout the world.

Effects of Wars and Commercial Systems Upon Foreign Trade

The immediate effect of war upon industrial and commercial policies is undoubtedly to prompt nations to make themselves as nearly as practicable, independent, in all things necessary to life and the national defense. When the war broke out, Great Britain found that the product of the Australian lead and zinc mines was under contract to German firms, and that neither in Australia nor Great Britain were there reduction works adequate in capacity to convert the Australian products into the

munitions of war which were needed for the defense of the Empire. Likewise, the great textile industries of the United States, Great Britain and France were found to be largely dependent upon German dyes.

In the long period of peace, international trade relations had expanded and confidence in the maintenance of peace had grown, until in many instances the industries of countries had become more or less interdependent. Even the neutral countries, as those of South and Central America, have found themselves seriously inconvenienced by the difficulties attendant upon transportation, and manifest an inclination to diversify and develop their home industries to a greater extent than ever before. In all conferences between representative men of the various dominions of the British Empire, there is expressed a sentiment favorable to more intimate trade relations, and to reciprocal policies which will tend to bring this about. It seems probable that steps in this direction will be taken, although serious difficulties are certain to develop when the attempt is made to reduce such a policy to tangible terms. In Russia the sentiment is very strong for a policy which will develop the country's resources and make it industrially independent.

It may be expected that the alliances established during the war will influence trade policies to some extent after the war, and that commercial treaties will be made with a view of recognizing and promoting the friendly relations which exist. The antagonisms in turn which have been developed between enemy countries will, no doubt, affect trade relations for many years, no matter what the terms of the treaty of peace may be. On the whole, it may be expected that protective tariffs will be in favor after the war, and that trade will be influenced to a considerable extent by commercial treaties. In this connection, it is to be considered that the United States, by reason of the great purchasing power of the people, is the most desirable market place in the world, and should be able to obtain as favorable terms for trade as are granted to any country.

Advancement of International Trade Through American Banks in Foreign Countries

There has been much discussion regarding the financial assistance available for American traders in their relations with foreign countries, and to those who take a far-sighted view of the situation with the power of perception and intellect, it appears that we, as a nation, are still inclined to pride ourselves upon our isolation and ability for self-sufficiency in thought.

No measure has been of greater importance, as affecting not merely the local financial conditions in the United States, but the entire situation from an international standpoint, than the Federal Re-

serve Act. Its facilities for branch-banking in foreign countries especially accord a great improvement of system in our local and international relations, likely to give the United States greater power in foreign trade.

If the United States succeeds in establishing a system of banking, thoroughly suited to modern conditions, a great step forward will have been taken in consolidating the progress already achieved through the financial and industrial energies of our population.

The banking element in our country should deal with these problems as seriously as is deserving and seek what help may be given to make the purpose of the law concrete facts by the scientific employment of capital in the shape of organized facilities, which in turn react to the benefit of the public from the operation of a well-regulated and uniform banking system.

Our foreign relations cannot successfully be developed so long as it is necessary to operate through banking institutions of competing countries, and while the Federal Reserve Act provides for the establishment of branches by member banks in foreign countries, and permits co-operative participation in the organization of banking interests beyond our borders, strange to say but few institutions are taking advantage thereof. Jointly owned banks would appear to best serve the requirements of the country as a whole, in that co-operation thrives well where action through association is legally possible and practically safe.

As a striking example of the great activity for the advancement of international trade relations, it is of greatest importance to recognize that British Overseas Banks alone have capital exceeding five hundred million dollars as against about five or six millions dollars so invested by North American interests. Our bankers must be determined to modernize their methods in this direction, particularly as the lack of far-sighted interest to further the system of American banking in foreign countries may seriously check the work of trade expansion.

The new Bank Act is essentially intended—as a commercial banking system—to assist in the financing of our domestic and foreign trade and provide a market for commercial acceptances, based upon the importation and exportation of goods. Such instruments, executed to cover specific purchases of commodities which are to be converted into cash during the life of the document, will tend to create a basic condition for automatic recording of commercial operations—an inherent factor to prevent over-extension of credit. In the case of time bills of exchange drawn on and accepted by banks or bankers of high standing, there is practical uniformity of security—not readily claimed when considering “commercial paper” with which the financial markets here are supplied—in that the

strength of such obligations are based upon the standing of approved commercial interests.

The superiority of the trade acceptance over the open book account for the purchase or sale of goods—its power to broaden the buying field for the merchant and enable the seller to handle his business at a smaller operation cost—is becoming more and more apparent to all interests alike. Whether that feature with us in business and banking will show a development of as huge dimensions as it has in Europe or take a secondary position, remains a matter of conjecture. The main point, however, for the people of a great nation to keep in mind is that the demand for modernized credit facilities is becoming universal and increasingly urgent, with the rightful expectation that it will place the economic position of this country on a firm and secure basis.

The power of a bank to accept a draft or bill of exchange enables it to make use of and to sell its credit, and so lend—for legitimate use in trade—vast sums without depleting its reserve or impairing its capability for making additional loans and advances to its clients.

A merchant, for instance, instead of borrowing cash on a note from his banker, can arrange—for a stipulated commission charge—to use the bank's credit for a certain length of time and a given amount. The small merchant's paper—endorsed by his bank—is as acceptable as that of the largest corporation, backed as it is by the security of the bank, and therefore readily discountable by virtue of its high intrinsic value as the most liquid form of investment.

Commercial Education

The general prosperity of foreign trade expansion can only be guaranteed by a ready co-ordination in all elements of our national and commercial strength. There is no more important national move than that which aims to make scientific study directly applicable to practical life, and to this it would seem that our first thought should be directed.

There is a very general acknowledgment that education is essential to business as it is to other departments of life, and viewing the subject from that standpoint it becomes apparent that a necessity exists for training our young element in the early stages of their development for business and labors which devolve upon them when at manhood they enter upon an active career.

The business world today is vitally interested in this problem, for no organization can succeed in a material degree whose workers are not efficient. The foundation of national prosperity clearly rests upon the result accomplished by its people to serve real purposes in sympathy with current industry, science and government. If we can encourage early, direct business training, the usefulness

populace of our country will assure both trading power and wealth.

The interest shown by our younger element in any subject pertinent to foreign trade, forcefully reveals the necessity of educational preparation, especially for the teaching of commercial languages of the world, and above all for the study of business fundamentals. Such training would have far-reaching consequences and give to our rising young men not only superiority as a means to augment the

value of their work to those who purchase it, but the capacity for conciliation in national and international affairs.

While it is probable that after the war this country will start less handicapped—commercially and financially—than any other nation in the world, if we are to retain this advantage and improve it, by no other means can it be than making ourselves more efficient—introducing into practice new and improved methods and providing the elasticity and security necessary in credit to our business affairs.

What the Tacomans are Doing

IN keeping with the records of other shipbuilding ports throughout the United States, Tacoma had a series of launchings during the month of May, which resulted in three vessels being added to the wooden fleet of the American merchant marine, one wooden vessel to the French fleet and a steel steamer to the list of American ships. All the launches were successful and the vessels are now being rapidly fitted out at the various yards.

The Tacoma Shipbuilding Company was among the first to put a ship overboard during May, this being the first launching from the yard of that concern. This vessel was the "Beloit", named after the Wisconsin city of Beloit. The "Beloit" is a Ferris type ship and a sister to the other craft being turned out at the Tacoma Shipbuilding Company's plant. She was launched on May 15th and among those who attended the ceremony were Arthur G. Prichard, treasurer of the company; John S. Baker, vice-president; Judge W. H. Snell, Captain Bustad of the Shipping Board, and J. S. Whitehouse.

The Wright Shipbuilding Company launched the Ferris type steamer "Yakima" from their plant on May 1st, this also being a first launching.

On the evening of May 22nd, the "Noyon" was launched at the Foundation Yards Number Four, and is the second auxiliary schooner for the French Government to be turned out here.

The "Cheron", a Ferris type wooden steamer, was sent into the water from the Seaborn yards on May 9th.

At the plant of the Todd Dry Dock & Construction Corporation, the "Masuda", the second steel steamer to be turned out by the plant, was launched on the evening of May 23rd. The launching was witnessed by President William H. Todd and a large number of Puget Sound and New York ship-ping men. The vessel was christened by Miss Ethel Eves, daughter of J. A. Eves, general manager of the shipyard. Among those present were James

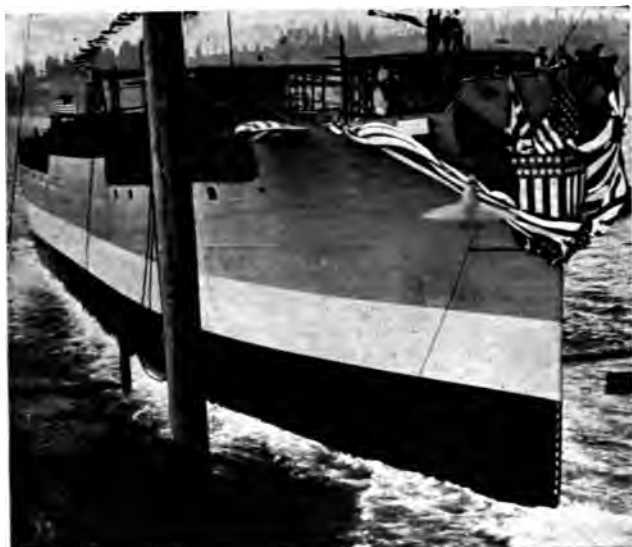
Barber of the Barber Steamship Company; New York; H. F. Alexander, president of the Pacific Steamship Company; William Jones, treasurer of the Pacific Steamship Company; C. W. Wiley, general manager of the Todd interests in the Northwest; C. S. Holmes, assistant treasurer of the ship-building company, and C. M. Riddell, mayor of Tacoma.

Following the launch of the "Masuda", President Todd announced that \$2,000,000 would be spent here by the company in enlarging the plant. The improvements will consist in the installation of boiler, foundry and machine shops, so that vessels can be fitted out entirely at the yard. The number of building ways will be increased to ten.

After having two Fairbanks-Morse heavy duty oil engines installed the freight steamer "T. W. Lake", owned by the Merchants Transportation Company, is expected to go into service within a few days. The operation of this boat, which was formerly propelled by steam, will be watched with interest by local freight boat and tug operators.

Damage to the extent of \$100,000 was suffered by the cargo on the Osaka Shosen Kaisha steamship "Burma Maru", which put back here on May 22nd, after sailing for the Orient, with her cargo on fire. The fire was discovered when the vessel was 216 miles out and was confined to the after hold. The freight in this hold was made up of cotton, automobiles and tin plate. The damaged cargo was discharged at the Balfour docks and the vessel reloaded and sailed on May 29th. Several deck plates were buckled by the heat, and one deck beam was damaged slightly.

Vessels of the Osaka Shosen Kaisha and other Japanese craft which have been chartered to W. R. Grace & Company, by the Emergency Fleet Corporation officers, are taking on fuel and coal cargoes here. The ships are stated to be listed for West Coast ports on the outward voyage, and thence to the Atlantic. Among the vessels leaving Tacoma were the "Kunijiri Maru", "Java Maru", "Penang Maru" and "Indo Maru".



Launch of the steamship "Masuda", from the plant of the Todd Dry Dock & Construction Company's plant, Tacoma.

The Osaka Shosen Kaisha during May had the largest number of vessels at Tacoma in the history of the line's activities at this port. There were six ships berthed at the Milwaukee docks in one day, or an aggregate tonnage of 24,000. During the entire month there was at all times from two to four of the company's vessels in port.

Coastwise lumber business out of Tacoma has been very light when compared with former years. There is some movement by steam schooners and the Peruvian bark "Belfast" got away with 1,600,000 feet of lumber for the West Coast. Local exporters declare that the off-shore markets are extremely quiet.

The auxiliary schooner "Roye", named in honor of the French city of that name, was launched at the Foundation Company's Plant Number Four on June 1st. This makes the third vessel launched at these yards since May 1st and the tenth wooden vessel to be launched by Tacoma builders since the Shipping Board's great shipbuilding program was started. At present it looks as though the Tacoma yards would average one launch per week. The "Roye", like her sister ships from this yard, is 280 feet long over all by 45 feet 6 inches beam. She will be rigged as a baldheaded five-masted schooner and powered with two triple expansion engines of 400 horsepower each. Among those present at the launching were Captain H. H. Williams, Captain Mannoni, Frank Walker of Seattle; Colonel Frank Ross and Mr. Cox of Cox & Stevens, the New York naval architects.

The "Gerberviller", the first vessel to be launched by the Foundation Company, she having gone down the ways on May 1st, was put through her trial runs on June 1st. The engines were in charge of George Kingsbury, who is superintendent of installation at the plant, and the ship in the hands of Captain H. H. Williams, French Government representative here. According to those in charge for the French Government, the trials proved highly satisfactory.

FUTURE DEVELOPMENT OF HARBOR AND RAIL FACILITIES FOR SEATTLE

(Continued from Page 104)

acting vertical ammonia compressor at 150 r.p.m., which is being used as a pump-out machine and general scavenger. All necessary equipment, such as condensers, pumps, etc., are installed in this building. In consideration of the human factor, safety appliances have been installed in the piping and on the compressors. The ice plant is located in the west half of this building, and has an ice making capacity of 100 tons of ice per twenty-four hours. The coils in the tanks are operated on what is known as the flooded system, and all the mechanical ice handling machinery and conveying appliances for the economical and convenient handling of the ice, have been installed.

The fish handling shed is one-story high, 101 feet by 109 feet, with a net floor area of 9640 square feet. This shed is used for the accommodation of fish brokers handling their fish in our cold storage plant.

Salmon Bay Terminal

On the south shore of Salmon Bay, about a mile above the locks in the Lake Washington Ship Canal, is located the Salmon Bay Improvement, comprising thirty-six acres of very valuable land. This occupies a strategic location in that it is the first site above the locks which is adapted for a terminal to accommodate large ships. Its ultimate development will await the coming of commerce through the canal, and will be governed largely by the nature of this commerce. A dock, net warehouse, and transit shed have been built to accommodate the fleet of Northwest fishing boats, and at times, there have been as high as 350 boats berthed at this terminal. One 300-ton and one 50-ton marine ways have been installed, and have been put to almost constant use by the fishermen, which makes it convenient to have such equipment near the mooring basins for their vessels.

A large area of this improvement, which was filled by hydraulic means recently, has been leased to the Meacham & Babcock Shipbuilding Company, who are building wooden vessels for the Emergency Fleet Corporation.

WIRELESS MANUFACTURING PLANT IN SEATTLE

The Kilbourne & Clark Company has purchased a three and a half acre site in Seattle, which will be developed into one of the world's largest wireless plants.

The old location has been purchased by the Skinner & Eddy Corporation, who occupy the adjacent area.

Oakland's Progress Reviewed

OAKLAND, the city of opportunity and of commerce,—how often have we heard this phrase,—yet, one has but to look at the map of the great State of California to realize that Oakland, situated on the continental side of the Bay of San Francisco, is destined to become one of the great harbors of the world.

A close observation of the map will show that San Francisco is situated like the small end of a funnel. Two great rivers and their tributaries, flowing from the high Sierras to the sea, empty into this bay. The great valleys of Sonoma, Sacramento, San Joaquin and Santa Clara, containing millions of acres of the most fertile soil in the world, all slope toward this point. These great valleys are capable of producing food sufficient to feed a nation the size of France. But as yet the surface has scarcely been scratched, and millions of acres await the hand of man. The two great ranges of mountains, one on each side of both the Sacramento and San Joaquin Valleys, running from north to south for a distance of over five hundred miles, contain minerals of all kinds, ready to be mined and turned into the hands of the manufacturers and made into articles of commerce and trade.

The natural and most economical route to the markets of the world for these products from the mountains and valleys is to the bay by the natural water grades, the land grades and land passes. Oakland, situated as she is, is the natural terminus for these products, as all grades and passes center here. Her waterfront stretches for ten miles along the western and southern sides of the city and cannot be surpassed as a terminal and manufacturing center. These facts are borne out when we stop to consider that the great trans-continental railway systems, the Southern Pacific, the Western Pacific and the Santa Fe Railway Companies have selected Oakland as the terminal for their several lines, and they have each spent millions of dollars in building up the facilities to handle their business.

During the year 1909 the city officials and commercial bodies, realizing the value of this extensive waterfront, advocated and finally bonded the city for two and one-half millions for improving and developing the natural harbor. At this time miles of the waterfront were held and claimed by private parties, some with valid and others without any title whatever. Efforts were made to acquire these holdings, and finally, during the year 1911, the titles to most of the frontages were acquired by the city.

During the years 1910 to 1914 the city had let contracts for building a 2000-foot quay wall, extending from Myrtle to Clay Streets, on the Estu-

ary of San Antonio, and for dredging and constructing a retaining wall in the Key Route Basin and the building of three apron wharves and one pier. The bulkhead in the Key Route Basin was moved out towards the deep waters of the bay 2000 feet, the city thereby acquiring 268 acres of marsh land, which has been partially filled with dredged material, making available land for factory sites. The Southern Pacific, Western Pacific and Key Route Railway Companies were each granted a 1000-foot strip for terminals under fifty-year franchises, with certain stipulations as to their use and development. These three companies have spent several million dollars in harbor improvement and will have to spend much more in order to carry out the terms of their several franchises.

During all this period and up to the year 1914 the tonnage passing over the few wharves the city owned and operated in the Estuary was very small and mostly of local nature.

Early in the year 1914 it was realized by the progressive men of the city that the Panama Canal would be opened very shortly, and with this opening would come ships with and for cargo, and an effort was made to get ready more available wharfage space. So the dredging in front of the quay wall in the Estuary was completed, and a large wharf shed was built. The old wharves were repaired and negotiations were entered into with several large shipping concerns with a view of getting them to make Oakland a port of call. Then came the war and the closing of the Canal, which put a damper on things of this nature.

During the latter part of 1914 and early in 1915, optimism having again taken hold, the city appropriated and spent in construction work, dredging and repairs some \$250,000. About this time efforts were made by outside capital to lease portions of the waterfront, and after some length of time in negotiating with the city officials, a lease was granted to the Albers Brothers Milling Company on the western waterfront, where said company has erected at a cost of one-half million dollars a wharf with warehouses, mills and grain elevators, covering a space 1026 by 300 feet, and housing the most up-to-date cereal mill on the Coast, and during the coming year this plant will be running at full capacity. This was the start.

During the early part of the year 1916 it became apparent that the ship tonnage to carry supplies to the allied army was far from being adequate, and through the activities of the U-boats, was becoming alarmingly less.

In the Estuary were five shipyards, Hanlon's, the Union Iron Works, Moore and Scott's.

Stone's and Barnes & Tibbetts'. These plants altogether did not at this time employ more than 1000 men. With the demand for vessels, however, they immediately became active, and while most of the work done by them was the building of small Coast steamers and sailing vessels and the repair of vessels that had become invaluable, owing to the lack of bottoms, these plants were doubled in size. Then the demand for large steel vessels became so great that during the fall of 1916, and when finally we entered the great war, these yards expanded until now they are employing over 15,000 men and are turning out the largest type of modern steel cargo carriers. With the demand for ships came the demand for food and clothing, and into Oakland harbor has come an enormous increase of tonnage of merchandise and millions of feet of lumber to be manufactured and distributed.

Realizing the advantages of the western waterfront as a deep water terminal, the Parr-McCormick Steamship Line applied for and obtained a lease to sixty acres of this property, on which it is to erect a system of wharves and warehouses, creating a terminal of the most up-to-date pattern. Every facility for the use of the shipper and manufacturer will be furnished here by this company. Its plans call for piers of the most modern type, warehouses of the most modern design with rail connections, so that the shipper can have his products handled in the most economical manner.

Two thousand feet north of the Parr-McCormick Company, sixty-four acres have been leased to the Union Construction Company, which, according to the terms of its lease, is to build one of the most modern shipbuilding and manufacturing plants on the Pacific Coast. It is now at work on this site, and having secured ten contracts from the Shipping Board is bending every effort to have its plant in working order. This plant, with that of the Parr-McCormick Company, will employ about 5000 men.

The Howard Company has, during the last year, erected at a cost of \$80,000 on property leased from the city, a modern wharf and warehouse, and during the month of April received the first cargo of sugar and copra, of 7200 tons, at this new wharf. This company does a business over its leased wharves that returns to the city an average of \$3000 per month in dockage and tolls, and this will greatly increase during the coming year.

The Southern Pacific Company, under its franchise agreement, was to erect a system of quay wall docks which its engineer reported to be of an obsolete type. The company obtained permission from the City Council to abandon this type of construction and erect five piers in their stead. These piers are to be 800 feet long by 400 feet wide, with sheds and warehouses with all the up-to-date facilities for handling freight. This construction will be commenced at once and two of the piers will be completed before January, 1919, in order to take

care of business over Long Wharf, which wharf will be removed at that time.

In the inner harbor, in what has been known as Brooklyn Basin, the Government has, during the last two years, built out of dredged material an island a mile long and 2000 feet wide, with a 300-foot ship channel on both sides to a depth of twenty-five feet at low water.

The housing, feeding and clothing of the enormous army of labor in the different plants now operating and in course of construction is a task of great magnitude, and every effort is being made to care for it in the best possible manner. The enormous tonnage of food, clothing and material will necessarily have to be shipped from the source of supply to Oakland, and a large percentage of this tonnage will have to be handled over our wharves. This means that during the coming year new wharves will have to be built to accommodate this increased shipping, and in view of this fact the Commissioner of Public Works is now busily engaged with his harbor engineer and staff planning improvements for Oakland harbor, which are absolutely necessary and will have to be provided for.

In order to show the great increase of business done in Oakland harbor during the last four years the following figures will be illustrative, showing the tonnage received during the years 1914, 1915, 1916 and 1917, and the amount of revenue derived by the city over its wharves while handling this tonnage:

	No. of Vessels	Tons Cargo	Feet Lumber
1914-1915	1495	181,795	3,875,000
1915-1916	2526	398,498	80,925,000
1916-1917	3983	719,021	154,236,805
10 months of fiscal year 1917-1918.....	4759	775,642	179,409,893

Revenues	
1913-1914	\$14,155.10
1914-1915	24,322.75
1915-1916	55,288.56
1916-1917	95,841.68
10 months of 1917-1918.....	110,967.06

Note—An increase in five years of 713 per cent.

Mr. Charles M. Schwab, in his recent visit to Oakland, made the gratifying announcement that contracts to the extent of \$35,000,000 had been awarded the Moore Shipbuilding Company's plant.

Mr. Schwab witnessed the launching of eight steel freighters at Oakland yards. San Francisco Bay's part in the colossal Fourth of July launching program consisted in sending seventeen vessels into the water.



MR. HARRY H. COSGRIFF, who succeeded Leo V. Merle as secretary to the Board of Harbor Commissioners in April, 1917, has been appointed commissioner to succeed Thomas S. Williams, resigned. Cosgriff was formerly in the real estate business.

The Shipping Board have definitely assigned to Struthers & Dixon for management, the four-masted bark "Moshulu", the three-masted ship "Arahapoe", the four-masted bark "Monongahela", the "Chilcothe", the "Flying Cloud" and the "Montauk".

Eight concrete hulls of 7500 tons deadweight capacity will be constructed for the Government on San Francisco Bay, under the management of the San Francisco Shipbuilding Company.

On June 10th, Haveside, Withers & Davis were given the contract for rigging seventeen of the five-masted auxiliary schooners building at the Foundation Company's Portland, Oregon, yard, for the French Government. This is one of the largest rigging orders ever let on the Coast.

Messrs. J. R. Hanify, Fred Linderman, Arthur Cahill, Ralph Meyer and Oliver J. Olson have all returned from Washington, where they went for the purpose of securing a readjustment of the Government charter rate for steam schooners of \$6.25 per deadweight ton per month. The committee argued for \$7.00 as a fair rate for steamers of over 2000 tons deadweight carrying capacity, and \$8.00 for vessels under this size. The matter has been taken under advisement by Mr. Charles R. Page of the Shipping Board, who is thoroughly familiar with Pacific Coast shipping conditions, and a favorable adjustment of the rate is looked for.

Mr. Drew Chidester, president of the Trans-Oceanic Company, returned recently from a three-months' tour of the West Coast ports.

Amongst the changes along California Street, noted in the past month, is the appointment of D. F. Mahaffy as branch manager of the Ship Owners Radio Service, Inc., the sales and service department of Kilbourne & Clark Manufacturing Company, makers of wireless apparatus. Mr. Mahaffy has been identified with transportation interests in San Francisco ever since the fire, and with his wife acquaintance in shipping circles here, should prove a valuable addition to the staff of the Seattle firm.

On account of the rapidly increasing business they are doing in radio manufacturing, the Kilbourne & Clark Manufacturing Company are considering it

necessary, both for their own good and for the benefit of their patrons, to establish service branches in the principal ports of the country; and their selection of a well-known local man of the ability and knowledge of local conditions, possessed by Mr. Mahaffy, is to be commended.

When the Home Fire & Marine Insurance Company of California made application to the various states for re-admission, it was discovered that the Home Insurance Company of New York had filed an objection in practically every state in the Union on account of the similarity in names.

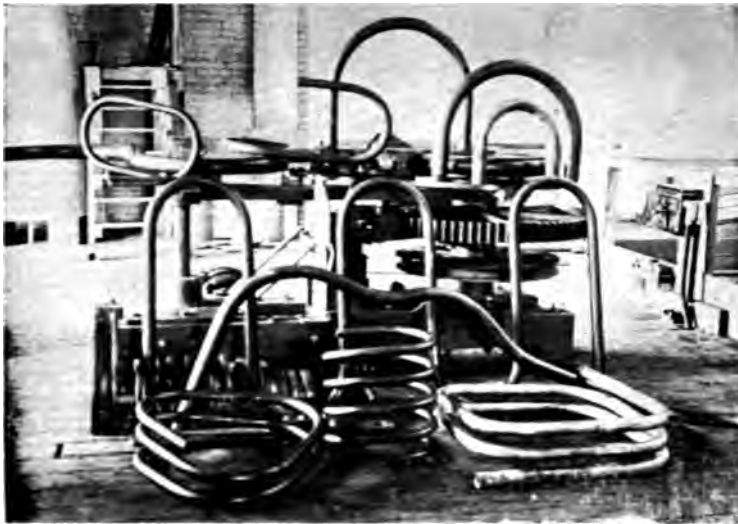
Up to the present time the Home Fire & Marine Insurance Company of California has been licensed in thirty-six states; and as the State of New York has just licensed the California company, it is fair to assume that the Home of New York will make no further objection and that the company will shortly be doing business in every state in the Union.

During the past month the King Coal Company took over the entire San Francisco Bay plant of the Western Fuel Company, including seventeen coal barges, two tugs and two lines of bunkers on the Oakland Estuary. The King Coal Company will supply Utah coal almost exclusively for ships bunkers, while the Western Fuel Company will confine its activities to production at the Nanaimo mines.

Articles of incorporation of the Concrete Boat Company of San Francisco have been filed, with a capital stock of \$250,000. The directors are Alfred B. Swinerton, C. J. Hillard, George S. Forderer, P. J. Herold and F. A. Kales. The purpose of the corporation is to build concrete and fabricated ships.

W. R. Grace & Company have received six of the Japanese steamers turned over to the Emergency Fleet Corporation to compensate for steel from this country for the Japanese shipyards. The six vessels turned over to W. R. Grace for the nitrate trade are the "Java Maru" of 7920 tons, "Shakano Maru", 7000 tons; "Penang Maru", 8325 tons; "Shinsei Maru", 6800 tons; "Kunashari Maru", 6386 tons, and "Ceylon Maru", 6440 tons. These tonnages being deadweight in each case.

The "Nanking", formerly the Pacific Coast Steamship Company's coaster "Congress", and rebuilt in Seattle, following her burning off Eureka, Cal., in 1916, was one of the arrivals in port during the month which attracted a great deal of interest.



The Wallace pipe-bending machine and a few illustrations of the type of work it turns out.

J. Aron & Company, the large and well known importing and exporting house with headquarters in New York, and branches in London, Chicago and New Orleans, opened a San Francisco office in the Merchants Exchange Building on the first of the month, with Mr. Louis Potter in charge.

"Peterson Number 20", the newly completed launch of the Peterson Launch Company, which was built by George Kneass, San Francisco's veteran boat builder, and powered with a 125 horsepower open cross-head Union engine, has been commandeered by the Government. The launch, a big powerful fellow, and the latest word in combination bay and ocean work craft. The Peterson Launch Company will order a duplicate boat.

The power barge "W. R. Fletcher", a part of the Fletcher-Wheeler river transportation fleet, was given a successful trial recently, her twin forty-five horsepower Acme engines driving her eight miles an hour from Oakland to Stockton.

Frank Stone, Oakland's well known wooden ship-builder, launched a fine shallow draft river freight boat from his yards last week. The craft is sixty-five feet long, twenty-five feet beam, and is equipped with twin thirty-five horsepower Union open-crosshead engines.

The former Lake Washington ferryboat "Issaquah", which was purchased recently for the Mare Island ferry run and towed down the Coast from Seattle, was pulled out on the Barnes & Tibbit ways during the month and found in excellent condition. She will soon be doing ferry service between the Island and Vallejo.

The half yearly report for the term ending December 31, 1917, of the Osaka Shosen Kabushiki

Kaisha shows profits of 22,192,248.17 yen. After deducting the customary reserves for insurance, repairs and depreciation of fleet, the net profit remains 18,347,248.17 yen, which with the balance brought forward from the previous term gives a total of 18,482,149.74 yen for distribution. The following disposition of this sum was made; to fund for adjustment of value of fleet, 2,500,000 yen; special depreciation of fleet, 1,500,000 yen; business extension fund, 1,500,000 yen; dividend equalization fund, 1,500,000 yen; 10 per cent dividend, 1,553,125 yen; extra 40 per cent dividend, 6,212,500 yen; fund for retiring land and marine officers, 1,000,000 yen; extra allowances to staff, 600,000 yen; leaving a balance to be carried over of 2,116,524.74 yen.

ALAMEDA PLANT TO EXPAND

THE most significant development in the East Bay district during the past month was the announcement of the Bethlehem Shipbuilding Corporation of plans for a great enlargement of the Alameda plant. Ten new ways will be installed, 160 acres having been secured alongside of the former Alameda plant properties, and this will carry the waterfront control right to the property of the Alaska Packers Association.

This expansion will call for an augmentation of the present army of shipbuilders which is employed at this huge yard that will be reckoned in the thousands.

The shop and yard equipment will also be brought up to a standard which will permit of the fullest use of the additional building ways.



The "Herbert L. Pratt", torpedoed off Cape Henlopen, southeast of Lewes, Delaware. She was a mile off when hit, but managed to keep afloat and make her way to shore. She lies in seven fathoms, her stern high in the air. This vessel has already been salvaged. International Film photo.

European Marine Notes

Exclusive Correspondence of the "Pacific Marine Review"

SINCE my last article we have had all kinds of alarms and excursions in the shipbuilding world. There have been further outpourings of talk about speeding up, with an occasional suggestion that speeding down in some cases might be useful. The Government has been blamed for one thing or another in connection with shipbuilding, and the shipbuilders have also come in for their share of castigation, although the critics attacking both are as often as not very badly informed as to the real facts of the situation. Further new important efforts have been made to secure more labor for shipbuilding and that industry in particular will not be one to suffer by the new Man Power Bill. This new measure increases the age up to which men can be compulsorily enlisted in this country to fifty-one years. The old age limit was forty-one years. Whilst many trades will be further denuded of male laborers as a consequence, in order that the fighting forces may be supplemented in the great struggle now proceeding on the Continent, shipbuilding will carry on as before, owing to the fact that it ranks with food growing and munitions making as an essential industry. Government committees and controllerships in connection with shipbuilding still undergo flux and change. This man resigns and that committee hands in its credentials, but other men come forward to correct the mistakes of their predecessors or perhaps upon the principle that a new broom always sweeps clean. Less and less of tradition and convention is allowed to rule in the Government's control of shipbuilding, but of course there naturally still remains quite a sufficient amount of red tape. Most people are very glad to welcome Lord Pirrie, who has just accepted the post of Controller General of Merchant Shipping. This peer was born poor as regards worldly goods, but he had a remarkable advance. He entered the firm of Harland and Wolff—which owes so much of its amazing development to him—when he was fifteen years of age, as an apprentice draughtsman; within six years he was head draughtsman, and at the age of twenty-seven a partner. A characteristic story is told about him which may not be strictly true. It is said that after one of Pirrie's visits to Liverpool, a shipowner wearing a more serious face than usual when he met his colleagues on the Exchange. He was asked "What is wrong?" His reply was, "Well, the fact is Pirrie has just been over and has persuaded me to order a ship, and I haven't the least idea what to do with it."

Lord Pirrie

The above remarks about Lord Pirrie may very effectively lead up to the statement that he is by many people here regarded as the greatest shipbuilder in the world. In his new post he is responsible to the First Lord of the Admiralty, is at liberty to attend meetings of the Board of Admiralty, and will have direct access to the prime minister and the war cabinet. A good deal of comment was heard in the lobby of the House of Common on this unique freedom of action. Those who have hitherto identified themselves with distrust of the admiralty on matters affecting merchant shipping are frankly delighted with an arrangement which, as one member puts it, "robs the bold braid of its power to obstruct". Others, like Sir Edward Carson, fear it may lead to friction between the Controller of the Admiralty and the Controller-General of Merchant Shipbuilding. But the general opinion is distinctly favorable to the Government proposal. A shipbuilder with a magnificent record behind him—and the crucial test on this great problem can be summed up in the one word "results"—is to be given a free hand, and almost everybody believes that he will succeed.

Shipbuilding Competitions

I believe that there is a strong naval backing for the idea of helping merchant shipping construction by making a definite appeal to the competitive spirit of the workers in the various shipyards. One suggestion, which seems to be sensible, is to put in every shipyard a sort of chart showing each week the amount of tonnage sunk, the amount of new tonnage constructed, and also the tonnage turned out each week in the various shipyards of the district. The workmen would thus have before their eyes a first rate stimulus to effort. They would see at once whether they are beating or being beaten by their rivals of the neighborhood.

Germany's Shipping Outlook

If statements in the Hamburg newspapers are to be relied upon, and to a large extent they are confirmed by information available on this side of the North Sea, German shipowners' prospects after the war are very uncertain. For some years it is considered probable that they will have a difficulty in again obtaining a footing in several important trades which they at one time almost monopolized, quite apart from any restrictive measures that may be adopted by the Allied Governments. Herr Ballin, director general of the Hamburg-American Line—who, it is believed, did his utmost to prevent war, knowing, as few did, the magnitude of the

commercial interests at stake, and who is understood to have fallen out with the Kaiser a year or so ago for his outspoken opinions on the subject—takes, I hear, a very pessimistic view of the future, and appears to think that North and South American, as well as Far Eastern, traffic will be hard to recover, whilst there will also be serious obstacles to overcome before business is resumed with the British dominions. For the purpose, therefore, of developing new enterprises, he is at present on a visit to the Baltic provinces, where, apparently, he hopes to take every advantage of Russia's breakdown. The possibilities of the situation are not, however, being overlooked by shipping people here, and circumstances may yet change for the better.

War Shipbuilding Designs

James Craig, one of the ship surveyors on the Glasgow staff of Lloyd's Register of Shipping, has been talking very interestingly to the members of the Institution of Engineers and Shipbuilders on some of the effects of war on merchant shipbuilding. In his address Mr. Craig said the interruption of international trading had not adversely affected the shipbuilding and engineering trades. If the trades manufacturing steel castings and forgings home production had increased because these trades suffered no longer from the peaceful penetration of Continental rivals. Many large extensions of steel works were in hand, and in the near future the output should be increased by from fifty to sixty per cent over pre-war capacity. Supplies of imported timber had been reduced, but home grown woods were taking their place, and ash, beech and harder pine woods, were being used for cabin fittings and framings, instead of finer imported woods, while reinforced concrete was being used for keel and bilge blocks. The high cost of spelter has led to economies in galvanizing, and the scarcity of copper to an increased use of steel piping. British textile manufacturers were now in a position to meet all requirements in the way of carpets—their products being equal to those obtained from Germany before the war. Practically all merchant vessels now had their double bottoms and other tank spaces adapted for the carriage of oil, and experience showed that all kinds of cargoes could be carried safely when the tanks were filled with oil.

Perhaps the most notable effect of the war on shipbuilding, Mr. Craig suggested, had been the increased development of standardization. It was highly improbable that by the adoption of standardization originality of thought and design would be arrested. There were large tramp-building firms who had standardized for many years, progressively maintaining their best types, and producing vessels rapidly by means of well organized methods and the best equipment. The routine of shipbuilding practice did not differ much from that of pre-war times, but there was a steady increase in the preparation of work from loft moulds, and a few

builders had prepared the inner strakes of outside plating right fore and aft from moulds, thereby economizing in the labor required for fairing the vessel when framed. This practice might be extended so as to include casings, deck houses, hatch coamings and shaft tunnels. In general designs the most striking departure was that which aimed at substituting straight lines for the curved lines of the normal vessel. This, it was claimed, would lead to economies in construction. Another design, proposed by Mr. Isherwood, showed a vessel with a long, parallel, midship body, arranged to make the work easily adaptable to the templating system, so that men trained to structural bridge work could deal with it. This was a departure entirely due to the war, and it might have an important effect on the output of standardized vessels. William Miller, O.B.E., of Greenock, Scotland, had introduced a notable change in framing which was a combination of the transverse and longitudinal systems, and which would probably show a saving in assembling and erecting. One vessel of this type was nearing completion, concluded Mr. Craig, and her behavior on service would be noted with much interest.

Hospital Ships for the Tigris

Apart from men in the business, probably few people know that in India there are extensive shipbuilding facilities, and that, when the present war difficulties regarding the supply of materials are removed, the shipbuilders of Calcutta and Bombay and other Indian ports may be capable of playing a not unimportant part in the reconstruction of shipping, especially of the class of tonnage required for the waterways of Mesopotamia and India and the coastal enterprise of Indian traders. The geographical position of India and her wealth of money and of labor may lead to India becoming a shipbuilding center of the future, and much interest has been created in that country by the recent visit of an Admiralty Commissioner to inquire into the possibilities of the industry in the Far East. So far production has been mainly in the lighter class of vessels, but the shipyards on the Hooghly River and in other parts of India are capable of expansion, and there is no reason why these should not construct the larger types of ships.

All that modern science and skill can do to alleviate the lot of men suffering from wounds or from the disease prevalent in Mesopotamia, has been applied to the construction and equipment of these floating hospitals. The Red Cross is conspicuous on the ships' sides, and, in addition, there is an ingenious illuminative arrangement above the ship which at night shows out brilliantly in the form of a cross, visible ten miles off, on either side of each vessel, so that the enemy cannot possibly plead ignorance of its marking as a hospital ship.



Mr. Fred A. Ballin, president Supple-Ballin Shipbuilding Corporation.

WITH THE SHIPBUILDERS

MR. JOSEPH SUPPLE, head of the Supple-Ballin Shipbuilding Corporation since its inception, has disposed of his interest in the plant to Mr. George C. W. Low, a New York business man and nephew of Seth Low, former mayor of Greater New York. The retirement of Mr. Supple has resulted in a reorganization of the executive staff of the concern, Mr. Fred A. Ballin, designer of the Ballin type of composite or steel topside ship, being elected president; Judge Arthur Langguth, vice-president and secretary, and Mr. G. C. W. Low, treasurer. Mr. Supple has been identified with the maritime development of the Portland district for the past thirty years, and previous to his arrival in the Northwest was engaged in ship construction at San Diego, California. He retains an interest in the Pacific Marine Iron Works and in the original Supple shipyard at the foot of Belmont Street, Portland.

Mr. J. A. Waddell of Washington, D. C., representing the Division of Production of the Emergency Fleet Corporation, and Mr. William A. Fannan, Northwest manager of the division, are inspecting machine shops and boiler shops on the Coast, having been in the Portland district during the middle of June, and from there coming to San Francisco.

Mr. Franklin Remington, president of the Foundation Company at New York, which controls eight shipyards throughout the country,

reached Portland on June 15th to inspect the first of the auxiliary schooners building by the Foundation Company at the Columbia River seaport, the "Capitaine Remy". He was accompanied by Captain Reo, marine expert of the French Commission, who inspected the French contracts under way at Tacoma.

Mr. E. W. Wright, manager of the McEachern Ship Company of Astoria, Oregon, returned to the Northwest early in June, following a trip to the East and South, where he inspected a large number of shipyards engaged in Government work.

Mr. A. F. Smith is back at the president's desk at the Columbia River Shipbuilding Company's Portland plant, after a trip of several weeks to the East.

Mr. Joseph Supple, until recently associated with the Supple-Ballin Shipbuilding Corporation, is now in Northern California looking after mining interests, and incidentally enjoying a well earned rest.

Captain E. D. Parsons, a well-known mariner, and formerly a Columbia River pilot, is back on the old job once more, after an absence of over a year.

Mr. Charles R. McCormick of San Francisco spent part of June at Portland and St. Helens, Oregon, attending the annual meetings of some of the McCormick interests incorporated in the State of Oregon.

Mr. Wilfred F. Smith, United States employment director at Portland, has been in Washington, attending a conference of the agents of various states in reference to the supply of shipbuilders.



Judge Arthur Langguth, vice-president and secretary Supple-Ballin Shipbuilding Corporation.



What the Columbia River Metropolis is Accomplishing Today

FLATTERING recognition was accorded a Portlander, Fred A. Ballin, during the month, by the selection of his design of a composite ship, by the Emergency Fleet Corporation, for one of the new 5000-ton types. Mr. Ballin is building 4500-ton vessels of the same kind at the Supple-Ballin plant, and the G. M. Standifer Construct-Corporation has commenced the first of six of the same plan.

The Ballin ship was considered with the Dougherty vessel, also with the reported new Ferris ship, which is an improvement on the original Ferris plan and an increase in size from 3500 to 5000 tons. The first of the Ballin ships is about ready here, and her final performance with cargo is being awaited.

H. D. Sandstone, a naval architect, and H. Y. Freedman, an attorney, have completed plans for an all-wood ship of 6200 tons capacity. They have sent the drawings on to the Emergency Fleet Corporation, after having conferred with Oregon representatives of that branch of the Government. Mr. Sandstone has been connected with various Northwest yards during the past three years, and it was after such experience that he turned his attention to the new ship. Double diagonal planking is provided for on the outside of the frames, as well as over the deckbeams, and in the construction of frames

straight-grained material is specified for the sides and lower sections. The vessel is to have a length of 350 feet, beam of 50 feet and depth of hold of 28.6 feet.

Assurances that Portland's battery of steel ship-building ways will be increased from seventeen to

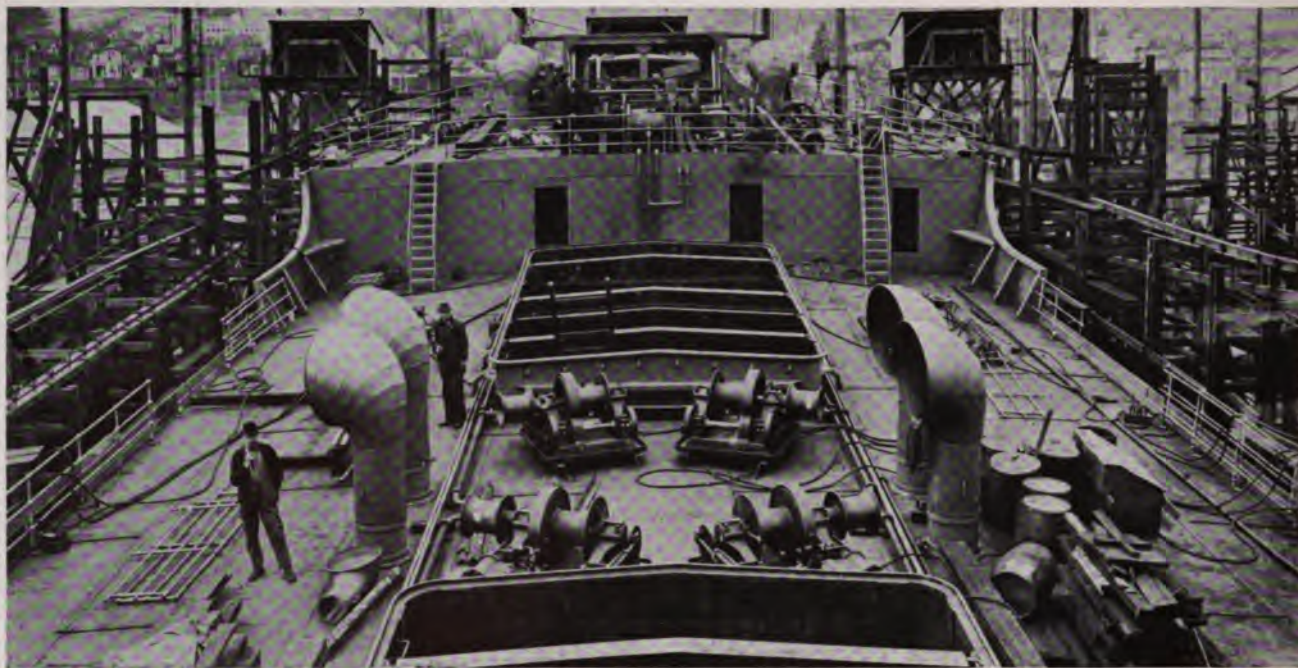
twenty-three, has created the greatest interest in construction and industrial circles of any development during June, the gain being brought about by the announcement of the establishment of a complete new plant by the Northwest Steel Company on a tract of forty acres, immediately adjoining the yard of the Coast Shipbuilding Company, where four ways will be installed, and an addition to the plant of the Columbia River Shipbuilding Company of two ways, giving the latter five.

The Northwest Steel Company already has a complete yard, with four ways on which thirteen of the 8800-ton steel hulls have been finished, but the Emergency Fleet Corporation, in extending the yearly output of ships in every possible way, called on the company to take

charge of the second plant. Under the present system the Northwest builds hulls and the Willamette Iron & Steel Works installs machinery and fits out the vessels. The new plant will have all facilities for that work, so vessels will be completed without shifting from the property.

OREGON SHIPBUILDING

	December 10, 1916	June 5, 1918	
Plants building steel ships	3	*4	
Plants building wooden ships ..	6	†17	
Number of employees.....	4,200	‡32,350	
Monthly payroll	\$302,400	\$3,493,800	
Steel cargo ships launched.....	.....	24
Tonnage of steel ships launched .....	.....	184,800
Wooden ships launched.....	3	72	
Tonnage of wooden ships launched	10,800	276,500	
Cargo ships in ways.....	11	94	
Tonnage of ships in ways.....	48,000	370,400	
Total amount of contracts.....	\$22,250,000	\$200,000,000	
Steel ships contracted for and to be delivered exclusive of above vessels launched.....		59	
Wooden ships contracted for and to be delivered exclusive of above vessels launched.....		98	
* 1 under construction.			
† 3 under construction.			
‡ Portland	26,150		
Outside of Portland....	6,200		
	<u>32,350</u>		
Steel	76,800 tons		
Wood	293,600 tons		
	<u>370,400 tons</u>		
Number of Vessels Launched	1916	1917	1918
Wood	3	31	42
Steel	8	16
Tonnage			
Wood	10,800	117,800	158,700
Steel	61,600	123,200
Total Tonnage	<u>10,800</u>	<u>179,400</u>	<u>281,900</u>



At work on 8800-ton freighters at the Columbia River Shipbuilding Corporation's plant in Portland.

During the month the Columbia River Shipbuilding Corporation closed with the Emergency Fleet Corporation for fourteen contracts, making a total of thirty-two ships in all, of which six have been completed. The Corporation now has another in the water, the first of the Isherwood type floated, and three more of that class are on the ways, with the fourth representing a return to the original hull construction. All are of the 8800-ton design.

Total contracts at the Northwest plant also number thirty-two ships, thirteen of which have been floated, and of the number ten have been delivered. The Albina Engine & Machine Works is credited with fifteen contracts, six of which have been launched and four delivered.

The understanding here is that the new yard of the Northwest Steel Company will be started with twenty contracts. The G. M. Standifer Construction Corporation's plant at Vancouver, Wash., having five ways, is to start with ten ships of 9500 tons. Steel for the vessels is being rolled, and early in July the first will be delivered. The plant, which is nearing completion, is said to be one of the best laid out in the West. Advantage is being taken of the time to attend to all details, and it is felt certain that once steel is on the ground, it will be fabricated and go into place with speed.

And all of the improvements at the Columbia River Shipbuilding Corporation's property are not confined to ways, for there will be a second plate shop erected to care for the extra building berths and the fitting-out dock is being extended. Also the corporation has almost rebuilt its administration building. The lower floor is given over to general and executive offices, with enlarged quarters for the auditing department, a rest room for the women and such additions. On the upper floor the

drafting room has been expanded and more light provided, also blue print rooms are more commodious. With fireproof vaults and indirect lighting, the various rooms are modernly equipped.

NOTES

Breaking the ice with its Government contracts, the G. M. Standifer Construction Corporation is hurrying its first Federal ship, the "Kineo", which was floated from its wooden yard at Vancouver, Wash., the last day of May. She is a Ferris type, but, unlike the standard ship, has twin screws. On the ways vacated by the "Kineo" the first Ballin ship was laid down. The company has five other Ferris ships on the stocks there, and four more at the North Portland wooden yard. The Ferris fleet will all be in the water before July ends.

Ship construction is a course added to many taught at the Benson Polytechnic School, that feature of the school being maintained at night for the benefit of shipworkers in the various plants. J. H. Abbott, supervisor of hulls at the Grant Smith-Porter Ship Company, gave twelve lessons to the students, and of fifty examined June 6th, there were thirty-eight passed. The enrollment is 225.

Captain E. S. Edwards, United States Inspector of Hulls, a position he has filled for twenty-nine years, departed from his hobby of collecting marine souvenirs in June, by presenting virtually his entire museum to marine societies and others. Numerous pictures of oldtime steamers were given to the Columbia River Pilots' Association and to Portland Harbor Masters', Mates' and Pilots' Association.

Fire aboard the sternwheel steamer "Paloma" June 7th, which broke out as she was lying at her berth, damaged the vessel to the extent of about

\$20,000. An investigation disclosed that it was due to an inexperienced fireman. The owners of the vessel purchased the tug "L. E. Thompson" a few days later, and will use her in harbor work. The "Paloma" is to be rebuilt, as well.

At Vancouver, Wash., a start has been made by the Great Northern Concrete Barge Company in stone vessels. For the present, efforts of the force will be confined to barges and inland vessels.

In preparation for the visit in July of Charles M. Schwab, director-general of the Emergency Fleet Corporation and Charles Piez, vice-president and general manager, and others from Washington, Oregon shipbuilders are preparing to launch at least one ship at every plant. Some will send two vessels into the water. The Grant Smith-Porter Ship Company propose to depart from the ordinary program in having five completed steamer ready for the inspection of the Washingtonians. The combined launchings are expected to represent more than 40,000 tons.

During the month, the Oregon drydock, which was purchased by the Heffernan Drydock Company, of Seattle, left the harbor, and after a short stay at Astoria, departed from there June 13th, in tow of the tugs "Tyee" and "Holyoke", bound for Seattle.

Return of the liner "Beaver" to the Portland-California service, after she had actually been commandeered by the navy department, caused satisfaction among shippers and the traveling public. Though proven patriotic in every way, Portlanders did not take kindly to being cut off from water transportation with only the liner "Rose City" to depend on, so their cry to Washington was heeded.

It is said the navy was averse to relinquishing the "Beaver", she being rated an excellent type for transport purposes.

In a report of tonnage turned out for the Government between January 1st and May 31st, aggregating 805,000 tons, it is shown that the Oregon district's share was approximately twenty-seven per cent.

After the executive board of the Portland Metal Trades Council had gone on record in favor of men in all shipyards working Saturday afternoons during June, July and August, in opposition to privileges granted under the Macey Wage Adjustment, a referendum vote of seventeen unions affiliated under the Council, defeated the proposal. The contention of the men is that such a movement should be initiated at Washington. The present arrangement provides for the men being paid double time if they labor Saturday afternoons during the summer. As a result, plants are not working all shifts that day except in emergencies.

Repairs were completed June 15th to the steamer "Daisy", which was damaged early in the month, when attempting to enter Willapa Harbor. A new sternpost, new rudderpost and repairs to her rudder; also caulking, summed up the damage.

Two Ferris ships built on Grays Harbor by the Grant Smith-Porter Ship Company are here for machinery installation, the "Manada" and "Bancroft". The work is being done by the Grant Smith-Porter plant at Portland.

Captains Silvertsen and other Navy Reserve Officers arrived June 14th, to join the freighter "Western Ocean", on trial, and her performance was such she was turned over to the navy the following day.



One of the recently completed Government freighters sitting out at the wharf of the Northwest Steel Company, Portland.



A recent launching at the plant of the Northwest Steel Company.

She was built by the Northwest Steel Company and Willamette Iron & Steel Works. She was the vanguard of the 8800-tonners completed here that will burn coal.

French interests have purchased the big steam schooner "John Kiernan", the only vessel so far undertaken by the Kiernan & Kern Shipbuilding Company. She is to be decked over here, so as to provide a shelterdeck for the entire space between the houses. The builders are negotiating with the Emergency Fleet Corporation for six contracts on 5000-ton steamers, and in anticipation of the business being closed for, have arranged to enlarge their plant and increase the building berths from one to four.

One of the few delays the tank steamer "J. A. Chanslor" has met with took place June 7th, when it was found one of the straps on the rudder had snapped. By putting the ship "down by the head", repairs were made without the necessity of dry-docking.

Plans are under way for the construction of a Government drydock here with a lifting capacity of 12,000 tons. The understanding is that it will be built of steel. The Port of Portland drydock is now the only plant here, and that is sorely taxed at times.

Since steamboat transportation has ceased on the Columbia River above The Dalles and on the Willamette River, between Portland and Corvallis, the matter has been brought to the attention of the Waterways Commission, at Washington, and special reports have been filed with that body. Since the Government is exerting efforts to relieve railroad lines on local business, the lack of steamboat service is being felt.

Interest in concrete ship construction has resulted in the Paquet Concrete Shipbuilding Company being formed with Joseph Paquet, pioneer steamboat builder, at the head. Associated with him are Julius Black and George N. Black, the latter having been connected with the American Shipbuilding Company, at Warrenton. Elwood Wiles, a concrete expert; George W. McBride, head of the International Shipbuilding Company; A. S. Rix of the same corporation, and Carl H. Jackson, have announced their determination to start a concrete steamer "Faith" on her arrival at Seattle, late in May.

Coos Bay interests are reported interested in a move to bring shipyards thereinto what is known as the Oregon district. Though the waterway is within the state, it was classed with the California district from the start of the Emergency Fleet Corporation's program. One argument advanced in favor of the change is that Portland is easier of access than San Francisco these days.

Progress is rapid at the new East Side plant of the Pacific Marine Iron Works, where a fitting-out yard is being established for installing machinery in Government vessels built at yards where only hull contracts are held. Slips are being provided to accommodate six ships at a time. A dredge is



A group of boilers ready for shipment at the plant of the Willamette Iron & Steel Works, Portland, Oregon.



Draughting room and cost-keeping department at the Willamette Iron & Steel Company's big Portland establishment.

clearing the openings to the necessary depth and piling has been driven for the piers, virtually all of them being planked and in readiness for the tracks for cranes. Besides installing machinery it is building for the vessels, the Pacific Marine Iron Works is to place machinery made by other plants that will be delivered under orders of the Emergency Fleet Corporation.

Contracts held by the Oregon Brass Works are said to exceed \$1,000,000, and the organization has been forced to obtain space at the foot of Flanders Street, so that its plant can be duplicated. It is estimated that the brass and bronze work on one of the 8800-ton steel ships represents about \$20,000. For vessels building at Portland, there are 110 bronze propeller blades under order, and an additional forty-two blades for steamers being turned out on Puget Sound.

Aboard the freighter "Western Wave", which was delivered to the Government the first week in June, is a De Laval turbine engine, the only one of the design so far placed aboard one of the 8800-ton carriers here.

In the most recent addition to names for wooden vessels building in Oregon, the following have been selected by Mrs. Wilson, wife of President Wilson: "Umatilla", "Montezuma", "Belding", "Arvonja", "Kinee", "Benzoia", "Moosabee", "Kangi", "Okiya" and "Aimwell" at the yards of the Standifer Construction Company. The "Braeburn", "Braxton", "Brazos" and "Brentwood" at the plant of the Peninsula Shipbuilding Company. The "Cabeza", "Cabura", "Boxbutte", "Boykin", "Boylston" and "Boyonton" at the yards of the Coast Shipbuilding Company. The "Airlie", "Ashburn", "Owensdow" and "Birchleaf", at the plant of Supple & Ballin. The "Matlapan", "Maratanza" and "Manzu", at the plant of Sommarstrom Bros., Columbia City. The "Lonoke" and "Bonifay", at the yards of the Rogers Shipbuilding Company, Astoria. The "Blue Eagle", "Capines", "Munra" and "Wanahbe", at the plant

of the Wilson Shipbuilding Company, Astoria.

As the wooden hull of the thirty-inch dredge "Columbia" has outlived its time, the Port of Portland Commission is investigating the advisability of having a concrete hull built. Hulls under the dredges "Tualatin" and "Willamette", also thirty-inch types, are of steel, but difficulty of obtaining that material today for such purposes has turned attention to concrete.

Eight of ten records held among wooden shipyards in the United States were captured by Oregon builders, at least credit for them has been given by the Emergency Fleet Corporation. The three leading points gained was the Supple-Ballin record of placing eighty frames in thirty-four working hours; the laying of a keel in five minutes by the McEachern Ship Company's force, and the completion of the hull of the steamer "Caponka" in forty-



A view in the G. M. Standifer Construction Corporation's wooden shipbuilding yard at Portland.

PACIFIC MARINE REVIEW

The Grant Smith-Porter Ship

Expecting to close for Government contracts for wooden barges of 2000 tons, of which there are to be 200 awarded, the International Shipbuilding Company, at Columbia City, has proceeded with the completion of three more ways. The first set have been in place several months, but adhering to its policy of not granting business to yards not already engaged in building Government tonnage, the Emergency Fleet Corporation has not favored the plant. Under a recent ruling, it is said such yards will be permitted to bid on the barge contracts.

Harry Humphreys, manager of the boiler department of the Willamette Iron & Steel Works, who is selected to represent the plant at Philadelphia, the new headquarters of the Emergency Fleet Corporation, was the honored guest at a dinner at the University Club on the eve of his departure. The fair was attended by Emergency Fleet Corporation officials, as well as officers of the Willamette plant. Mr. Humphreys had been connected with the organization here seventeen years.

Barracks have been completed by the Columbia Shipbuilding Corporation and the Northwest Steel Company; also by the Supple-Ballin Shipbuilding Corporation, for housing members of the Oregon State Police, who are on duty at the yards guards.

SHIPYARD ACTIVITIES

The "Wasco", a product of the Grant Smith-Porter Ship Company, had her trial trip early in June, and on June 8th, sailed to Nanaimo, B. C., to load a cargo of coal back to Portland, the coal to be used in bunkering her sister ships. The "Wasco" is a Hough type wooden steamer, twelve of which have been launched by the Grant Smith-Porter company. A few invited guests were permitted to make the run down river to Astoria on the "Wasco" and expressed themselves as highly pleased with the vessel's performance. Since the trial of the "Wasco", the Grant Smith-Porter Company has been awarded an additional contract for six additional ships of the Morris design.

For the second time this year a frame crew at the Supple-Ballin Shipbuilding Corporation's plant has broken the record for placing frames, having lowered the former mark of seventy-nine frames in forty-four hours to eighty frames in thirty-four hours. The ship on which this record was made is of the Ballin steel topsides type of the 4500-ton deadweight class.

Colonel Gray, late commander of the 11th Northumberland Fusiliers, and the first speaker sent to the Oregon and California shipyards by the National Service Section of the Emergency Fleet Corporation, is meeting a warm reception in the shipyards, the Portland plant of the Foundation Company

turning out an audience of over three thousand to listen to one of his impressive speeches.

Among those performing special services in Portland shipyards is Mrs. Lulu Dahl Miller, a well known contralto singer, who is conducting almost daily concerts in the shipyards during the noon hour.

PORTLAND SHOP EXPANSION

Shops in the Portland district, whose facilities are now devoted to the production of ship equipment will be expanded wherever possible and those which are only devoting a part of their capacity to this work will be given additional orders. Shops devoting their equipment to purely commercial purposes will probably be drawn upon in part to aid the division of production of the Emergency Fleet Corporation.

Mr. William A. Fannan, manager of this division in the Northwest, recently spent a week in Portland looking over the situation and establishing an agency. He was accompanied on his rounds by representatives of the Emergency Fleet Corporation and the Portland Chamber of Commerce. An index system was called into service and an entire check made on the facilities on hand. A general gathering of the heads of the concerns is planned, at which foundations will be laid for substantially increasing the shop output of the Portland district. While many Portland shops have done their utmost, others, not having received direct orders for work, had imagined that their efforts were not required and that all work was already taken care of. It is now planned to turn the facilities of any shop which may be of use to good account.

TRIALS OF THE "CAPITAINE REMY"

The steam auxiliary schooner "Capitaine Remy", built by the Foundation Company's plant at Portland, was given a trial spin on June 11th. The vessel steamed from Portland to the lower end of Martin Island, thirty-two miles, and made eleven knots at times, whereas her contract speed is nine knots.

The Foundation Company undertook the construction of twenty vessels of this class and nine of these are now afloat. The tenth and possibly the eleventh vessel will be launched before the firm's first anniversary, which falls in the latter part of the present month.

Among those on board the "Capitaine Remy" during her trial were Charles F. Sweigert, manager of Portland yard; Theodore Knudson, plant superintendent; F. W. Drury, assistant Pacific Coast manager for the Foundation Company; Captain Le Mannoni, inspector for the French Commission Washington; Captain E. C. Genereaux, representative of the Bureau Veritas, and inspector for the French

Government at the plant, and Captain Kildall, who was in charge of the vessel during her trial.

On the run, the machinery was found to function perfectly and no minor troubles occurred. The "Capitaine Remy" was away from the yard for six hours, covering the thirty-two mile course down stream in two hours, fifteen minutes and fifteen seconds and returning against a freshet current on the Columbia in three hours, three minutes and thirty-five seconds.

The main engines are two triple expansion, inverted cylinder, vertical engines of 350 horsepower each, and steam is supplied by two Roberts water tube boilers working at 225 pounds pressure. No effort was made during the trial to extend the equipment to its fullest capacity, the engines being held to 169 revolutions against their full power speed of 175 turns.

The "Remy" is furnished with a turbo generator for wireless and electric lighting set, and the air pumps and other engine room auxiliaries have independent drives. The vessel is 280 feet over all, 46 feet beam and 27 feet depth of hold. She has a deadweight capacity of 3000 tons and a lumber capacity of 1,500,000 feet, although the arrangement of her deck houses do not lend themselves to heavy lumber carrying, as only about 200,000 feet could be stowed on deck. She is built of Oregon fir throughout with Eastern oak as trim in the cabins.

PORTLAND PERSONALS

Mr. Lloyd J. Wentworth, supervisor of wooden ship construction for the Portland district, spent the early part of June in the San Francisco district, while Mr. T. L. Tomlinson, supervisor of wooden construction for the Emergency Fleet Corporation in the California district, inspected the Oregon plants at the same time.

Mr. W. G. Tait, assistant manager of the division of transportation of the Emergency Fleet Corporation, with headquarters at Seattle, has estab-



Assembling crew at the Supple-Ballin Shipbuilding Corporation, which set up eighty hull frames in thirty-four hours.

lished an agency at Portland, with Mr. W. P. Walso, formerly with the Union Pacific Railroad, in charge.

Mr. James McKinlay, general manager of the Columbia River Shipbuilding Corporation of Portland, was a visitor to San Francisco during June.

Mr. G. A. Hemstreet of San Francisco has opened Portland, Oregon, offices for the Oliver J. Olson Company.

Mr. John L. Nield has gone to Everett, Washington, to accept the position of superintendent of the Norway Pacific Construction & Dry Dock Company. Mr. Nield was for twelve years with the Moore & Scott shipyard, Oakland, Cal.

The many friends of Mr. J. A. Tompkins along the Coast will be interested to learn that he has departed for Manila, where he will occupy the important position of engineering sales manager for the Pacific Commercial Co. for the Philippine Islands, and superintend the construction of several motorships for that firm and clients. Mr. Tompkins has had a world wide engineering experience, his principal activities on this Coast being with the Seattle Construction & Dry Dock Co., where he was works manager, and with the Skandia Pac. Engine Co.



The "Wasco", the first wooden vessel of the Emergency Fleet Corporation's building program to be delivered at Portland, Oregon.

FIREMAN'S FUN

Insures Hulls, Cargoes

HEAD OFFICE: CALIFORNIA AND SAN FRANCISCO

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

G. KIRKHAM SMITH, Special Agent
914-15 BOARD OF TRADE BLDG.
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

Freight Report

By Page Brothers

OUR last circular was dated May 22nd, and there has not been a great volume of business done. We have not a single time charter to report.

For miscellaneous charters, we have to report steamer "Flavel", from a nitrate port to San Francisco, at \$22.50. American ship "Aryan", from Wellington to San Francisco, private terms, by J. J. Moore & Co., and the "McLaurin" from a New Zealand port to San Francisco, on private terms, also by J. J. Moore & Co. The "Aryan" is now being loaded on the berth from here to Wellington by J. J. Moore & Co., and the "McLaurin" direct from here to a New Zealand port, is being loaded by the Union Steamship Company.

Copra freights are still in great demand from Australia, and especially from the South Sea Islands to this port. The "Dauntless" and the "Resolute" have been chartered from Sydney to San Francisco by Burns, Philp & Co., at \$40.00. Australian parties have chartered the British schooner "Alexa", from San Francisco to Sydney at a lump sum of \$22,000, which on her case oil capacity, means practically \$2.00 a case. American vessels are only allowed \$1.375 per case for the same voyage,

which leaves a wonderful margin of profit for buyers in the Antipodes when they buy on basis of U. S. Government rate of freight.

The steam schooner "Daisy Matthews" gets \$7.00 per ton of 2000 pounds for sugar from Honolulu to San Francisco, and was paid \$20.00 per thousand feet by the S. E. Slade Lumber Company from the North Pacific to Honolulu.

The latest nitrate charter has been that of the auxiliary sailer "Suzanne" from a nitrate port to Honolulu at \$25.00 a ton. The new schooner "Rose Mahony" has been commandeered by the United States Government, after discharging her present cargo at a New Zealand port, to load wheat for San Francisco at 95/ per ton, and on the latter account has been obliged to decline very high rates of freight for tallow and hemp from New Zealand to this port.

The Japanese Government has tendered about fifteen or twenty steamers already, as per agreement between the Governments of Japan and the United States to the latter, in exchange for permission to ship a certain amount of steel from this country to Japan. Several of these vessels were allotted to W. R. Grace & Co., to Wessel, Duval and M. E. Kinsley, New York, and though most of them have gone and are going in ballast from Puget Sound to Chile. Coal cargoes for four of them have been arranged in New York. The Shipping Board rate on their vessels to Chile with coal has been \$15.00 per ton of 2240 pounds with, in some cases, 750 tons per day discharge.

Several steamers have been chartered for lumber at \$45.00 per thousand feet, from the North Pacific to Peruvian and Chilean ports, namely, the "Western Wave", by Braden Copper Company, "San Diego", by W. R. Grace & Co., "Flavell", by Balfour, Guthrie & Co., "Stanwood", by Mohns Commercial Company, and steamer "Faith", by Balfour.



Launch of the "Isanti" at the Schaw-Batcher shipyards at South San Francisco, California.

INSURANCE COMPANY

Freights and Disbursements

STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Special Agent
220 BYRNE BUILDING
LOS ANGELES, CAL.

O. G. ORR & CO., Managers
ATLANTIC MARINE DEPARTMENT
37-43 WALL STREET NEW YORK

AND BRITISH COLUMBIA, 264 COLMAN BUILDING, SEATTLE, WASHINGTON

four, Guthrie & Co. The latter (concrete steamer) had been intended to go to Cuba with rice, etc., at about \$20.00 a ton, but the insurance companies did not consider that she had quite proven herself enough to encourage them to give particular average insurance on rice to Cuba. Therefore, the owners resolved to charter her for lumber to Chile, and intend, after that, to load her with nitrate to the East Coast of the United States, and if results are as good as they have been on her first voyage, presumably she will have established herself as a complete success.

For Australia, nothing new has been done, nor for Africa, nor for the Orient.

Purchases of vessels have fallen off, partly for the reason of the United States regulations just passed, which do not allow of any American vessels over 100 tons register to be transferred to foreigners. Then, again, there is a lack of speculation because rates of freight have been pretty well established in different parts of the world, and there is no chance to re-let at higher prices.

FIRST NEW JAPANESE VESSEL SOLD AND DELIVERED TO U. S. SHIPPING BOARD

S. S. "Eastern Sun", formerly "Taifuku Maru", No. 20, had the honor to be the first new Japanese vessel sold to the United States Shipping Board,

with Seattle as its port in receiving this first of fifty vessels to be sold to the Shipping Board and Emergency Fleet Corporation.

This vessel was transferred by Suzuki & Company, Colman Building, head office of which is Kobe, Japan. The vessel's capacity is 9000 deadweight tons, and was built by the Kawasaki Dockyard Company, Ltd., Kobe, Japan.

Through two agreements, the first of which took place April 24th, between Ambassador Morris and Japanese shipbuilders, Japan will transfer about fifty new vessels, fifteen to be covered by the first agreement, which is the exchange of one ton of steel for one deadweight ton of vessel, while thirty-one vessels will be covered by the second agreement of one ton of steel for two deadweight tons of vessel.

Dockyards throughout Japan are now working at their full capacity in building these vessels for United States Government and Allies.

The spirit of co-operation in the full prosecution of war is now prevailing in Japan, with a combined effort of both Government and private companies.

Mr. W. P. Cassell, special agent of the Home Fire & Marine, with headquarters at 264 Colman Building, Seattle, is paying a short business visit to the head office in the Insurance Exchange Building, San Francisco.



The "Eastern Sun", formerly the "Taifuku Maru", sold and delivered to the U. S. Shipping Board at Seattle in June, 1918. She is the first new Japanese vessel sold to the United States under the new steel supply understanding between the two countries.



Mr. William F. Fletcher, sales manager Cutting & Washington.



A RADIO WITH A RECORD

There was a time when radio apparatus was considerable of a mystery to the lay mind, but nowadays the wireless is accepted with the same feeling as the telephone or telegraph, it is an accomplished fact, is the product of several well known makers of apparatus, and is an essential part of every sea going-vessel's equipment, unless her small size or the nature of her business exempts her from carrying it. The user of wireless, then, has but to ask himself, is this apparatus which I am considering reliable; is it efficient, what are its initial and upkeep costs and what guarantee do I get that it will give satisfaction? From the owner's point of view, these are the four cardinal points from which his wireless apparatus will be judged.

As the wireless apparatus of today is a proven article, it is rather surprising to see that one company is demonstrating a marked superiority in the working of its sets on one branch of the marine service. This firm is that of Cutting & Washington of Cambridge, Massachusetts, and the point where they have demonstrated the superiority of their mechanism is in its application to small boats. The wireless on small craft had never been wholly a success, owing largely to the limited antenna field. Cutting & Washington saw a chance to prove something distinctive in favor of their wireless apparatus by invading that part of the wireless market which was most beset with difficulties, since any radio apparatus that achieves a full measure of success on a small craft will be even more successful when placed on a larger boat. The success achieved by the Cutting & Washington sets on small craft, of both steel and wood, was very marked and drew immediate attention to the other excellent qualities possessed by this apparatus.

The silence of the Cutting & Washington apparatus is a strong point in its favor when in use on passenger ships, while the low voltage used makes for safety. This apparatus is favored by operators on account of its extreme simplicity and ease of operation, and at the same time, gives the owner some cause for very serious thought on the matter of initial cost and upkeep charges.

In their decision to sell their apparatus outright rather than lease it to vessel owners, Messrs. Cutting & Washington were influenced by many considerations, among them being

that radio operators were plentiful and easy to secure, and that therefore it would be as easy for an owner to secure his own operator, as it would be for a company to secure one for him. The prime reason, however, was based on the matter of costs. Comparing a rented and an owned apparatus over a period of ten years shows a differential in favor of the privately own set of \$7500. Such a saving is not to be despised by any means, and in the days when normal competition shall return once more to the ocean highways and byways it is the man who watches out for and takes advantage of such savings who will retain some profit out of his ventures upon deep water.

STRATTON AIR SEPARATOR

The question of how to increase the number of rivets driven by every pneumatic hammer, is receiving considerable attention at the present time when everyone is endeavoring to do everything possible to speed up the shipbuilding program.

In this connection the Stratton Air Separator is of particular interest.

Water in compressed air is detrimental to the efficient operation of a pneumatic riveting hammer. This water occupies valuable power space in the cylinder of the tool, thereby reducing its driving force and sooner or later, causing damage to the tool.

Therefore, an apparatus which will insure a dry compressed air supply, will assist in increasing the number of rivets per hammer.

The Stratton Air Separator is designed to mechanically remove water from compressed air. It is simple in construction, has no internal movable parts and will operate indefinitely with practically no attention.

The air and water entering the separator are caused to pass through a helical path formed about a central cylinder, resulting in a swirling motion. As water is several hundred times heavier than air, it is thrown out of the curving air current by the action of centrifugal force, meets the wall at an angle without any spatter or splash, and adheres, to trickle down to the receiver space at the bottom. The air passing on its way out of the separator is free from moisture.

This separator is constructed of close-grain cast iron suitable for a working air pressure not exceeding 160 pounds per square inch.

The Griscom-Russell Company, 90 West Street, New York, who are the manufacturers of this separator, have

WESTERN DROP FORGE COMPANY

To tell the story of the origin of the Western Drop Forge Company is to repeat that of many other plants that sprang into being far above the fondest anticipation of their founders.

When Mr. R. E. Lunkley started out with the idea of a small shop,—just a couple of small drop hammers, to take care of local work, he little dreamed of the demand that would come from all points on the West Coast; and to meet that demand it became necessary to change the first plans, and build on a much larger scale,—and yet the dream had not ended, for hardly had the roof been closed in before it became necessary to again extend the shop. So the acorn planted gives evidence of becoming a large oak, and so the first plans of two hammers grows to forty, and the end is not yet.

The shop is intended to help in the great game that is before us all, to help win the war. And as soon as the equipment can be secured and set up, they will be placed in motion, making marine forgings to help in fitting ships for sea by delivering to the West Coast yards the small forgings required without the delay and haul from the East.

The plant is situated at No. 301 Horton Street, east from First Avenue South, and extends from Horton Street to Hinde Street. The present shop is 40x200 feet, with the office on Horton Street. A receiving room for material has been built at the east side of the shop, with racks for material. Plans are out for a large power plant to be built between what will be the two shops, with a die sinking room in the rear of the boiler house. At the Horton Street end will be a receiving room for material, where material will be cut into lengths and distributed to the hammer units of the various shops. The shipping room will be at this end also and will be built adjacent to the No. 2 shop. The shop is not yet equipped to deliver forgings, but every effort will be made to get the die sinking machinery and hammers going as soon as possible.

The officers of the company are R. E. Lunkley, president; Wm. R. Le Blond, vice-president; Jos. A. Hyde, Jr., secretary and treasurer, and L. Ashworth, general manager.



The cracked shear frame ready for welding.

A BIG WELDING JOB

A good illustration of the value of the oxy-acetylene torch is shown by the repair of a shear frame at the Youngstown plant of the Pacific Coast Steel Company. This repair was made by the Davis-Bournonville Company's branch office, Seattle.

The frame was broken, due to an improper adjustment of the cutting jaws, which allowed a heavy piece of steel to become wedged in such a manner that the strain was thrown on the lower corner of the frame. This caused the frame to crack along the lower side for a distance of fifty inches, with a depth at the thickest point of thirty-six inches.

As the frame weighed thirty-five tons, it was decided to weld the break without moving the frame any more than was necessary. The shear was dismantled and the break was chiseled on both sides with an air chisel. A furnace was then built around the break and the casting brought up to a red heat by means of a coke fire. One side of the break was welded, and the frame was then allowed to cool. When cold, it was turned over by means of a crane, and again heated, and the balance of the weld made.

When it was thoroughly cooled, the weld was touched up on the rough spots, and the casting was ready to put back into place. The weld required 600 pounds of cast iron filler rod, and during the welding operation two torches were used continuously. Due to the intense heat radiated from the casting, water cooled torches were used, because of the better protection of the operators and the greater ease of welding, as it was not necessary to stop at any time to cool the torches, and the operators were not troubled by flashbacks due to hot tips.

CENTRIFUGAL BOILER FEED PUMPS

In a pamphlet entitled "Centrifugal Boiler Feed Pumps", the De Laval Steam Turbine Company, Trenton, N. J., describes the De Laval combined steam turbine and centrifugal boiler feed pump. Centrifugal pumps have been used for feeding high-pres-

sure steam boilers for a number of years, but the machine here described differs from those previously used in that the steam turbine rotor and the pump impellers are mounted upon one shaft with only two bearings, and are enclosed within one housing. The combined turbine pump casing is split horizontally, and by lifting the cover all internal and working parts are exposed. The steam and water connections are in the lower part of the casing and are thus not disturbed when the pump is opened. The turbine is of the velocity-stage type and the pump contains either two or three impellers, according to the boiler pressure.

One of the most remarkable features is the extremely small size and weight of this type of pump. A pump for 300 boiler horsepower occupies a floor space of only two by three feet, as against about eight times that space for an ordinary duplex pump. Turbine-driven centrifugal pumps in

one housing are made in capacities from 2000 to 10,000 boiler horsepower. For larger units up to 60,000 horsepower the pump and turbine are built separately but mounted upon a common base plate. The pamphlet also describes electric motor-driven units.

BUSINESS PERSONALS

The Bank Line Transport & Trading Company of San Francisco, has moved its offices to the American National Bank Building, 485 California Street, in order to secure larger quarters.

The Overseas Shipping Company has removed its Chicago headquarters from 327 South La Salle Street to 332 South Michigan Avenue, Chicago.

The Pacific Coast sales offices of the Bethlehem Steel Company, the Bethlehem Steel Products Company and the Bethlehem Steel Bridge Corporation have been transferred to the Monadnock Building, 681 Market Street, San Francisco.

The Columbia River Shipbuilding Corporation of Portland, Oregon, has received an order for thirty large Scotch marine boilers for vessels of the Emergency Fleet Corporation's fleet.

The prominent import and export house of Gaston, Williams & Wigmore, Inc., of New York, have organized an affiliated corporation, to be known as Gaston, Williams & Wigmore Pacific Coast Company, to operate on the Pacific Coast. The head office of the new company will be in the Monadnock Building, San Francisco, and Mr. James C. H. Ferguson, who is well known in shipping and export circles, will be the Pacific Coast manager. Mr. Ferguson will continue to act as local representative of the Cramps Shipbuilding Company of Philadelphia and the American Engineering Company of the same place and, in his new capacity, will also look after the affairs of the Gaston, Williams & Wigmore Steamship Corporation (Globe Line) of New York, which concern has several ships operating on this Coast.



Owing to the weight of the frame, it was moved as little as possible and was practically welded where it stood.

Mr. Charles A. McCune has resigned his position as chief engineer of the Commercial Acetylene Company to become sales engineer of the Page Steel & Wire Company, at 30 Church Street, New York, where his efforts will be devoted to sales and service in connection with Armco welding rods.

The Parsons Marine Steam Turbine Company, Ltd., has moved its American headquarters to 2 Rector Street, New York.

R. D. Pinneo has been appointed Atlantic Coast manager of the Pacific Steamship Company, and has opened offices in New York, his former title was foreign freight agent and his headquarters Seattle.

BUILDING SPOT WELDERS

The new factory of the Pacific Electric Welder & Manufacturing Company has been erected at Renton, near Seattle, Washington, and close to the shores of Lake Washington. The main building is 147 by 200 feet in size, and is thoroughly modern in every respect, great care being taken in its design to secure the maximum of light and the closest co-ordination of the different departments so that the articles manufactured on the property should have every advantage, both from an economic and workmanship viewpoint. The factory site has direct rail connections with the Northern Pacific and the Chicago, Milwaukee & St. Paul Railways, as well as water connections with the entire maritime world.



View in one of the bays of the Pacific Electric Welder & Manufacturing Company's plant at Renton, Washington.

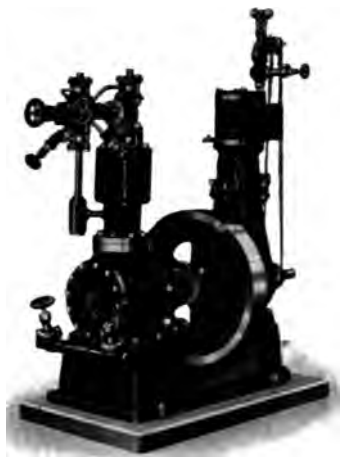
The principal object of manufacture is the Pacific Electric Welder, a machine invented and perfected by Mr. Carl Hugo Thornblade, who is president of the corporation and chairman of the board of directors, as well as being in full charge of the company's industrial plant.

This machine, letters patent on which were granted on September 5, 1916, combines great efficiency with simplicity and safety in manipulation, and is intended to take the place of riveting and other forms of joining metal. The process of operation is

very simple and easy. The two or more pieces of metal required to be joined are placed under the points of electrodes, electrical contact and the welding is instantaneously accomplished. The machine is noiseless, makes a smooth joint and is exceedingly economical of power. The machine can be adapted to butt or seam welding, and can be operated automatically.

The machine is adapted to a peculiarly wide range of work and its economy and reliability has won for it a wide and growing use in metal-working plants of every description.

ICE MACHINES FOR SHIPS IMMEDIATE DELIVERY



"QUALITY FIRST"

BEDELL ENGINEERING CO.
Engineers, Manufacturers, Contractors
LOS ANGELES

*We offer our experience of many years
as specialists in Marine Refrigeration.*

ELECTRIC PLANT FOR SALE

**Used One Year
First Class Condition**

Complete Westinghouse Turbine Generating Set

One Turbine 50 K.W. $\frac{125}{250}$ 200 Amp. 1200 R.P.M.

One Turbine 25 K.W. 100 Amp. 1800 R.P.M.

Two 110 H.P. Boilers Two Pumps

One Westinghouse 2 H.P.M. 115 V. Speed 1100

One 3 Panel Switchboard

Henry Broderick, Inc.

Hoge Bldg.

SEATTLE, U. S. A.

Established in New York—1844

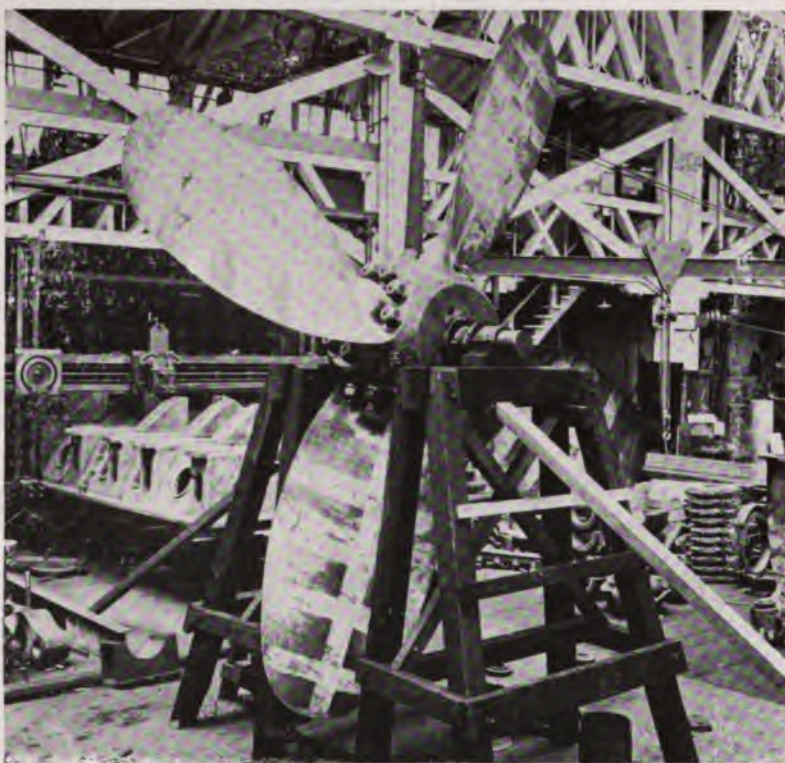
A. SCHRAMER'S SON, Inc.
783-803 ATLANTIC AVENUE BROOKLYN, N. Y.

Manufacturers of
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Large Stock Always on Hand
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Outfits for Contractors, Waterworks,
Sponge and Pearl Fisheries, Etc.
Pacific Coast Representatives
Seattle, Washington
Pacific Net & Twine Co.
San Francisco, Cal.
Ford Barstow Ship Chandlery Co.



THE ENTERPRISE BRASS FOUNDRY

The Enterprise Brass Foundry is the largest foundry on the Pacific Coast devoting its main resources to casting bronze propeller blades for shipbuilders. The photograph herewith shows a group of bronze blades which have been cast and are being assembled for testing purposes, these



A big bronze propeller in the shop of the Enterprise Brass Foundry, Seattle.

blades being made for the Ames Shipbuilding Company. Another well-known shipbuilding firm which uses Enterprise blades is the Skinner & Eddy Corporation. The superiority of bronze blades over cast iron or steel is well known, and the Enterprise Foundry is looking forward to an ever-increasing business in pro-

peller work during the present and coming seasons.

THE GEORGE R. COOLEY ELECTRIC COMPANY

The George R. Cooley Electric Company of 813 Western Avenue, Seattle, has just finished its contract for electrical installation on eight vessels for the J. F. Duthie & Company shipyard, and at the present time is

working on contracts for eighteen additional 8800-tonners for the same company.

The Cooley Manufacturing Company, of which the George R. Cooley Electric Company is the sales agent, has just issued a catalog of its electric marine fittings and fixtures. This catalog is splendidly illustrated with

very clear cuts of the company's output, and will prove both interesting and valuable to those who purchase electrical equipment for ships. The concern's Seattle factory is working to capacity filling local marine orders for both wooden and steel ships, and those interested in the outfitting of vessels will find the plant well worth a visit.

SEAMLESS SHAFT TUBES SLEEVES

Seamless tubing of from four inches to twenty-two inches outside diameter with a maximum length of approximately 200 inches for shaft sleeves are difficult to make, if they are to machine sound and free from imperfections.

Ship engine builders are constantly confronted with the problem of how to have perfect sleeves on hand when they are needed, and are often forced to recast and remachine tubes which did not show signs of defects until the last stages of machining were completed.

The Sandusky Foundry & Machine Company of Sandusky, Ohio, insure their customers against expensive experiments by furnishing sleeves all finished, machined, bored smooth and true, ready for shrinking or pressing on, rough turned to within.

The internal stresses being uniformly distributed by the compressive action upon the fluid metal during the process of formation, expansion and contraction take place uniformly without undue distortion of the tubes and an even grip on the shaft is thus obtained.

Their shop practice permits neither peening nor plugging.

Every sleeve is carefully inspected prior to shipment and only perfect sleeves are allowed to leave the establishment.

The Sandusky Foundry & Machine Company can furnish sleeves of any description or composition meeting Lloyds or the Bureau Veritas requirements. For all around purposes they recommend what is termed propeller shaft sleeve composition No. 1, which is approximately 85 per cent copper, 6 per cent tin, 6 per cent zinc and 3 per cent lead, as this metal has proven itself particularly well suited for machining, shrinking or pressing on and for wearing qualities.

The Propeller Question Solved is the title of a new leaflet just issued by the American Screw Propeller Company, Penfield Building, Philadelphia, Pa., designers of screw propellers and propulsive experts. This leaflet contains many interesting facts in regard to the above company and its work, as well as a list of its prominent clients. All those interested in propellers should obtain a copy of this leaflet and learn how the propeller question can be solved.

WANTED—Assistant Superintendent for wooden shipyard. Must have thorough experience in large construction work and handling of men. None but experienced shipbuilder wanted. State experience. Address Box 937, Astoria, Ore.

For Sale—FOUR NEW LAUNCHES, 45 x 11 feet with 50 H.P. STANDARD engine.

LAUNCH, 52x12 feet, with 65 H.P. STANDARD engine.

LAUNCH, 65x18 feet, with 11 H.P. STANDARD engine.

CAR-FLOAT BARGE, 272x50x15 feet, net tonnage 1374 tons.

FOUR WHALEBOATS, 30x6½ feet, very cheap.

CROWLEY LAUNCH & TUGBOAT COMPANY,

Howard St. Wharf, San Francisco, Cal.

"As it should be."

The
"COEN SYSTEM"
 OF
Mechanical Oil Burning

Up to date, this system has been ordered for over three million tons
 of steel shipping commandeered by, and being constructed
 for, the United States Shipping Board
 Emergency Fleet Corporation

	Ships	Tons
American International Shipbuilding Corporation, Hog Island	180	1,385,000
Seattle Construction & Dry Dock Company, Seattle, Wash.....	10	75,000
Skinner & Eddy Shipbuilding Corporation, Seattle, Wash.....	68	590,400
Los Angeles Shipbuilding & Dry Dock Co., Los Angeles.....	30	264,000
Schaw-Batcher Company, San Francisco.....	28	246,400
San Francisco Shipbuilding Company, San Francisco.....	1	5,000
Craig Shipbuilding Company, Long Beach, Cal.....	2	18,000
Jahncke Shipbuilding Company, New Orleans.....	12	60,000
Hanlon Dry Dock & Shipbuilding Company, Oakland, Cal.....	6	32,100
Oscar Daniels Shipbuilding Company, Tampa, Fla.....	10	95,000
Columbia River Shipbuilding Corporation, Portland, Ore.....	22	195,600
Bayles Shipyard, Inc., Port Jefferson, Long Island.....	4	20,000
Albina Engine & Machine Works, Portland, Ore.....	4	10,000
Pensacola Shipbuilding Company, Pensacola, Fla.....	10	90,000
Pacific Coast Shipbuilding Company, San Francisco.....	10	94,000
Virginia Shipbuilding Company, Alexandria, Va.....	12	108,000
Downey Shipbuilding Company, Staten Island, N. Y.....	10	75,000
Total	419	3,363,500

**Write us for information regarding "Coen" Combination
 Coal and Oil Firing Fonts**

COEN COMPANY, Inc.

OIL BURNING SPECIALISTS

SEATTLE OFFICE
 115 Grand Trunk Dock

PORTLAND OFFICE
 51 First Street

**EXECUTIVE OFFICES
 SAN FRANCISCO**

NEW YORK OFFICE
 50 Church Street

PHILADELPHIA OFFICE
 303 Finance Building

PLEASE MENTION THE PACIFIC MARINE REVIEW WHEN YOU WRITE

WHITE BROTHERS' BULLETIN

A good part of the activities of the business world for the past few weeks have been centered on the Third Liberty Loan Drive, which is coming through in fine shape. This earnest concentration for the big cause is just what is needed in all lines in order to put it over.

The building business is practically nil at the present time, as all our energies have been diverted to war work. This, of course, is as it should be.

Getting down to the specific conditions in the hardwood business, we find a growing scarcity of dry hardwoods in the hands of dealers and mills in the East. One inch quartered oak eight inches and over wide is practically impossible to obtain in the Eastern markets on account of the Government using it for aeroplane work. A strange fact in the matter, however, is that the Pacific Coast yards, far from the scenes of activity, have good stocks of this material. Heavy plain oak also is scarce in the East.

Mahogany, i. e., straight grain stock suitable for propellers, has been taken by the Government. About sixty-five per cent of the mahogany in the hands of dealers will go for this purpose, leaving the most highly figured stock for sale to the general trade. In the wood, also, there seems to be a better stock on the Pacific Coast than in the East.

All woods are going up in price and users should be prepared to pay more for their hardwoods very shortly. The rise in prices of hardwoods has not kept pace with the rise in other commodities, but it is our opinion that practically all hardwoods are due for a sharp advance very shortly.

Regarding the general hardwood situation nothing very definite can be said, of course. Each day brings new developments and demands, but as we get accustomed to the straining in different directions, so do we also become adept in solving the problems and adapting our resources to the conditions at hand. Following these lines, the San Francisco market has kept up a good sized stock of the regular hardwoods and by constant industry in maintaining an adequate assortment for supplying the enormous needs of the present time.

LIBERTY SHIPBUILDING CORPORATION

A contract for the building of concrete ships at three shipyards along the Atlantic Coast, one to be estab-

lished eventually near Boston, one now under construction at Wilmington, N. C., and one already in operation at Brunswick, Ga., that will reach an aggregate of \$20,000,000 within a year, according to present estimates, was consummated recently at Washington, between the United States Shipping Board and the Liberty Shipbuilding Corporation of Massachusetts.

The principal officers of the company are Boston men and the general manager is Lewis R. Ferguson, formerly a member of the United States Shipping Board and for nearly fifteen years secretary of the Cement Dealers Association of the United States. The officers of the company are: President, Wm. J. McDonald, a prominent Boston real estate operator; vice-president, Matthew Hale; treasurer, Max Shoolman.

The contract completed yesterday is an agency contract, supplementing a previous conditional contract awarded the company. Under the new contract the Government will own the properties, but the ships will be constructed by the company and bought by the Government. The contract is to continue until the end of the war, or as long afterwards as required.

The main plant of the company will be at Wilmington, where the construction work is now under way. At this plant ten ways will be built, and it is estimated that the first concrete ship will be turned out within three months. After that it is hoped to launch one ship a week, or an average of fifty a year. The ships will be completely fitted out at the Wilmington plant, all the installations being put in there. The ships will range in size from 3500 to 7500 tons deadweight and will be launched from channel ways, sideways launching being provided for in the contract. It is probable that the company will be called upon to furnish about eighty vessels in all.

The contract is the first made by the Government for reinforced concrete ships, though it is expected an-

other contract will be awarded immediately to another company building similar vessels on the Pacific Coast.



Mr. F. S. Lang.

A HOTEL RANGE TURNED OUT COMPLETE EVERY THIRTY MINUTES**How a Seattle Firm Made Good on Government Contract**

On July 5, 1917, the United States Government at Washington called for bids for supplying ranges for the Camp Lewis Cantonment with cooking capacity for 50,000 men.

The F. S. Lang Manufacturing Company of Seattle, submitted their bid, and on August 1st was awarded the contract calling for 460 hotel ranges, 460 sets of oven pans and 5000 feet of stove pipe; contract to be completed and final delivery made by October 1st.



View of the Oakland plant of the Edwin Forrest Forge Company, a leading institution of its kind in the West.

This was quite an undertaking for this company, which only a few years ago was a struggling "infant industry". Mr. Lang marshalled his forces and began the work of getting out the largest order of hotel ranges ever placed on the Pacific Coast. More than 500 tons of iron were used, and a large number of men were employed in making and mounting these ranges.

The work had only gotten fairly under way when word came from Washington that it was imperative that delivery be made more rapidly than called for in the contract.

This request from Washington was promptly and efficiently made, and the contract was complete and final delivery made on September 11th, twenty-two days ahead of schedule, an achievement that places the F. S. Lang Manufacturing Company at the head of the list for promptness among contractors furnishing cantonment supplies and equipment.

The F. S. Lang Manufacturing Company is now supplying nearly all of the shipbuilders on the Pacific Coast with a specially built ship range, which has been found to be a wonderful fuel saver. The Ames Shipbuilding Company, Grays Harbor Motorship Company, Seattle Construction & Dry Dock Company, J. F. Duthie & Company, the Foundation Company, and numerous other concerns are installing the Lang ship ranges in the bottoms now being constructed, and they have been found to be the most practical and efficient ship range on the market.

The Lang range, by its new principle of burning all fuel from the top, is guaranteed to save from 35 to 50 per cent on fuel bills. It is built with one fire box only for heating one, two and three ovens at the same time.

That the range is more efficient than other ranges is proven by the fact that the factory is running to its utmost capacity and cannot keep up with the demand.

By the Lang system of heating, all smoke and gases are consumed before entering the smoke flue and all ranges built along these lines by others are an infringement on the Lang system of fuel burning.

THE FORREST PLANT

Retiring from active business in 1916, Mr. Edwin Forrest, who had been identified with the machinery and metal working industries of San Francisco for many years, decided to take a long rest in the Hawaiian Islands, but when the United States entered the war, he heard the old call and was soon re-established in what rapidly developed into the largest forge plant on the Pacific Coast.

Mr. Forrest's connection with the metal industry in San Francisco covers a period of twenty years, he having been foreman of the old Pacific Rolling Mills and for ten years general foreman of the Risdon Iron & Locomotive Works. This work was varied by his taking charge of the Tajo mines in Rosario, Mexico, for several years.

In building up his latest business venture, Mr. Forrest has made good use of years of experience which taught him that good work and large output went hand in hand with the



Large steam hammer at work in the plant of the Edwin Forrest Forge Company at Oakland, California.

highest type of shop equipment. In this regard he has been fortunate in securing some very heavy equipment, despite the difficulties encountered in filling requirements in many branches of machine and metal working tools today.

Among the tools to be found in the Edwin Forrest Forge Company's Oakland plant are a 1200-ton hydraulic "United" forging press; 8000-pound, 4000-pound, 2500-pound and two 1500-pound steam hammers; a 1200-pound and a 600-pound Bement hammers. The steam supply is taken care of by four 100 horsepower boilers, while duplicate sets of hydraulic pumps take care of the presses. An Ingersoll-Rand compressor supplies air for a full assortment of air tools. The main bay of the forge shop is

served by a twenty-ton steam crane, and there are bracket cranes and hoisting tackle wherever required. There are sixteen oil fired furnaces and the fuel supply for these is stored in two 50,000-gallon oil tanks. The company also has its own water supply drawn from deep wells on the premises. The present shops, two in number, are 200 by 100, and 100 by 100 feet in size. The handling problem through and about the building is taken care of by a system of narrow gauge tracks and cars, which connect with a Southern Pacific Railway spur track, where heavy weights are handled by stiff-legged derricks and steam winches. Water shipments are handled in the same way, the shop being only 200 feet from the Oakland Estuary.



A 1200-ton United Engineering Company's hydraulic forging press in the shop of the Edwin Forrest Forge Company.



Albina Engine and Machine Works, Inc.

WM. CORNFOT, President.

Ship and Engine Building

Shipbuilders Machinists Bollermakers Copper Smiths Founders

**QUICK SERVICE AND SPECIAL ATTENTION GIVEN TO
ALL SHIP AND ENGINE REPAIRS**

**OFFICES AND YARDS,
Lewis and Loring Streets,
PORTLAND, OREGON, U. S. A.**

**NEW YORK AGENTS,
A. O. ANDERSEN & CO.,
50 Broad Street.**

Nippon Yusen Kaisha



Tonnage—500,000 Tons

Fleet—99 Vessels

Head Office: Tokyo, Japan

TRANS-PACIFIC PASSENGER SERVICE

Between Seattle and Hong Kong via Japan Ports, Shanghai and Manila, with direct connection for all points in the Orient and Australia.

First-class passenger steamers with all modern conveniences will sail from Seattle as follows:

KAMO MARU July 5, 1918
FUSHIMA MARU July 25, 1918

For further information, rates, tickets, berth reservation, etc., apply to any office of the principal railways in the United States and Canada, also any office of Messrs. Thos. Cook & Son, Messrs. Raymond & Whitcomb Co., and other tourist agencies in all parts of the world, or to the

Nippon Yusen Kaisha

Colman Building, Seattle

Railway Exchange Bldg.,
Chicago

Equitable Bldg.,
New York

ENGBERG GENERATORS

The Engberg Electric & Mechanical Works, St. Joseph, Mich., have published a booklet descriptive of their direct current generating sets, especially adapted for marine service. This booklet, which is designated as Bulletin No. 102, should be in the hands of every builder of ships, as well as prospective builders and owners, because the owner of obsolete equipment will undoubtedly profit by knowing what he should have, and sooner or later, see the wisdom and economy of possessing modern apparatus.

After twenty years of experience in designing and building of engines and generators, the Engberg Electric & Mechanical Works can well say: "We invite careful inspection and investigation, because the general principles, as well as the smallest details, have never failed to attract the attention of the most critical buyer."

Ideals formulated after twenty years' experience have produced an engine and generator that for dependability, economy in steam and oil at low cost of maintenance, stands as a remarkable piece of equipment.

Mr. Edward Looker has resigned as assistant district auditor attached to the Shipping Board office in the Northwest, and has become general manager of the Wooden Shipbuilders Association of the State of Washington.

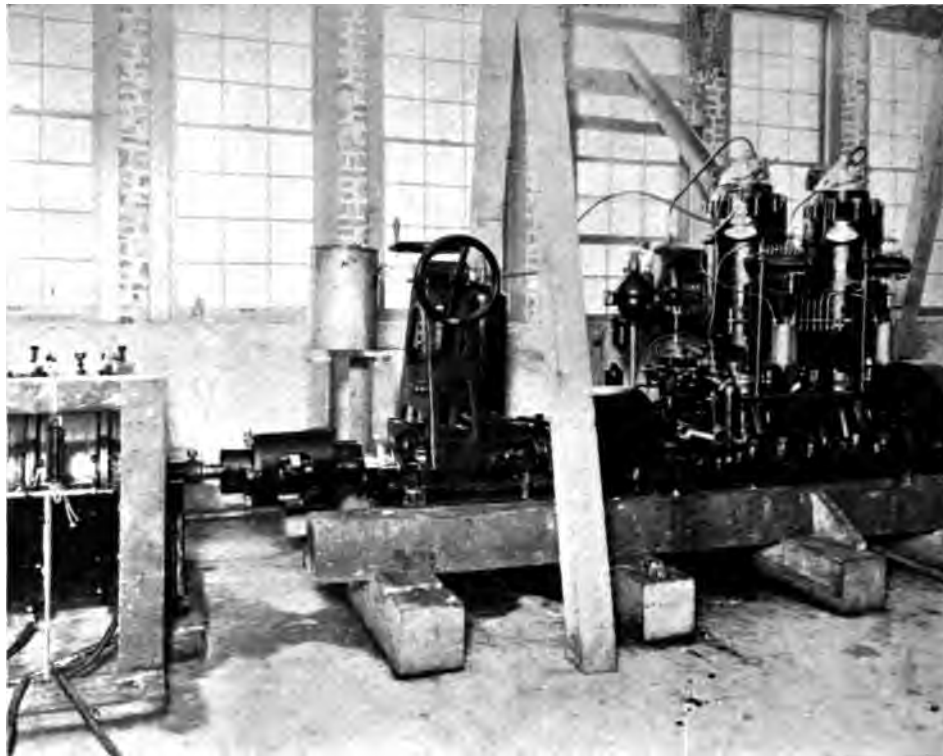
THE GULOWSEN-GREI ENGINE

The A. Gulowsen A/S of Christiania, Norway, has recently organized and incorporated the Gulowsen Grei Engine Company, under the laws of the State of Washington, and is erecting a half million dollar plant at Seattle, where the Gulowsen Grei heavy oil engines will be manufactured for the American trade.

The A. Gulowsen A/S was established in 1889, and is thus one of the pioneer heavy oil engine manufacturing concerns of Europe. The Gulowsen Grei engines have been developed to the highest standards of European engine practice, repeatedly carrying off the highest honors for oil engines in many of the great engine exhibits of Scandinavian and other countries. It was the only make of engine that received the Grand Prix at the Norwegian Centenary Exhibition in 1914.

The Gulowsen Grei engine is of the two-cycle hot-bulb type, heavily built and slow running, with large bearing surfaces and capable of burning crude or residual oils. It will be interesting to American engine users to know that the use of Gulowsen Grei engines among the fishing and workboat fleets of Northwestern Europe is extremely extensive, and this bespeaks a large measure of success for the makers of this engine among the similar fleets which have their headquarters in Puget Sound waters. The engines are simple in operation, and highly efficient under the most trying conditions of service, as they are of sturdy build, with high factors of safety governing the design throughout. Governing of the engine is taken care of by control of the quantity of oil admitted to the combustion chambers, thus avoiding waste of fuel when the engine is slowed down. An extended variation of speed has been secured in the Gulowsen Grei, and they will run without lamp, electricity or other mechanical means of ignition, whether at full load or running idle.

The Gulowsen Grei Engine Company will have at Seattle, when completed, one of the most modern and up-to-date manufacturing plants in the country. The Gulowsen Company in Norway has always stood for service and all that this name implies, and this policy will be continued in



A two-cylinder Gulowsen-Grei engine on the test stand.

the American factory. No innovations or radical departures in structure or design are embodied in the Gulowsen Grei engines until they have been proven practical by the most thorough and exhaustive tests.

One of the latest makes of Gulowsen Grei, one hundred horsepower engines is now on exhibition at the Seattle demonstration rooms of the company. This engine has been favored with the critical inspection of a large number of Northwest engineers, fishing and tugboat owners, etc., and has been highly praised.

As the Gulowsen A/S is one of Norway's leading industrial establishments, there is every indication that the Seattle factory will meet with flattering success, and that the Gulowsen Grei engine will rapidly assume an important place among the marine engines in use on the Pacific Coast.

IMPORTANT MANUFACTURING DEAL

The Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has purchased the property, business, and good-will of the Krantz Manufacturing Company, Inc., Brooklyn, N. Y., manufacturers of safety and semi-safety electrical and other devices, such as auto-lock switches, distribution panels, switchboards, floor boxes, bushings, etc.

The Supply Department of the Westinghouse Electric & Manufacturing Company will act as exclusive sales agent for the products of the Krantz Manufacturing Company, whose business will be continued under its present name.

Mr. H. G. Hoke, of the Westinghouse Electric & Manufacturing Company, will represent the supply department at the Krantz factory.

WHITE BROTHERS

HARDWOOD



LUMBER
TIMBER
FLOORING
VENEERS
PANELS

INDIANA BENDING OAK-TEAK-ASH
WHITE CEDAR-IRON BARK-MAHOGANY
— — — LONG OAK KEELS — — —
EASTERN WHITE AND RED OAK, ETC.

FIFTH and BRANNAN STREETS
SAN FRANCISCO, CAL.

THE LARGEST STOCK OF HARDWOODS IN THE WEST

PLEASE MENTION THE PACIFIC MARINE REVIEW WHEN YOU WRITE



The advertisement is framed by a decorative border of small, repeating geometric shapes. At the top center is a circular logo with a stylized 'P' and the word 'PARAGON' inside. Below the logo is a detailed illustration of a ship's bow, with smoke rising from the funnels. In the foreground, three tools are shown: a chisel blank, a punch, and a die. To the right of these tools are two patch bolts and a rivet set. Below the tools is a horizontal line representing a stud.

CHISEL BLANKS.
PUNCHES.
DIES.

PATCH BOLTS.
RIVET SETS.
STUDS.

THE BEST TOOLS ARE IMPERATIVE FOR THE MAXIMUM SPEED
THE SKILLED ARTISAN DEMANDS & DESERVES THE BEST OBTAINABLE &
WITH PARAGON TOOLS HE GETS THE BEST AND HE KNOWS IT.

PARAGON·HIGH·GRADE·STEEL·TOOLS
MANUFACTURED BY
PARAGON TOOL COMPANY
411. OCCIDENTAL AVENUE
SEATTLE. WASH.

PLEASE MENTION THE PACIFIC MARINE REVIEW WHEN YOU WRITE

REVIEWS

Union Plant. The first number of the publication issued by the employees of the Union Plant of the Bethlehem Shipbuilding Corporation is an extremely creditable effort, both in the matter of contents and make-up. The "Union Plant", and this name, by the way, is temporary, and will be replaced by one chosen in a prize contest, for June contains a foreword by Joseph J. Tynan, and many interesting shop notes and sketches of those who have helped to make this plant world famous.

Aristos Copperweld Copper Clad Steel Wire is the title of a 104 page illustrated book just issued by the Page Steel & Wire Company, 30 Church Street, New York. This book contains notes on the manufacture of wire in general, on physical and electrical properties of composite (copperweld) wire, gives tests, specifications and suggestions for determining sizes of wire on high tension, trolley, telephone, telegraph, signal, police and fire alarm lines, sag and tension in spans, etc. Individual chapters also deal with the different sizes of plain Copperweld wire, Copperweld weather-proof wire, twisted pairs, strand, bond wires, tie wires, ground rods and other Copperweld products. A copy will be mailed on application to Page Steel & Wire Company, 30 Church Street, New York.

Lovekin Pipe Expanding Machinery is the title of the catalog describing the pipe expanding machinery constructed by the Lovekin Pipe Expanding & Flanging Machine Company of Philadelphia. By the Lovekin method the end of the pipe is cold rolled into a flange, the inner face of which is grooved. The metal is expanded into these grooves, and the full section of metal in the pipe is retained through the flange, thus obviating the weakening which occurs in screw joints, and the dangers of distortion from bearing, penning or welding. The machines for carrying out this work are fully described, and a request to 421 Chestnut Street, Philadelphia, will bring this catalog to any one interested. The Lovekin machines have found an extended use in shipyard work.

Baker-Hansen Air Compressors, Blowers and Vacuum Pumps are described in Bulletin 11a, issued by the Baker-Hansen Company of Oakland, California, makers of high grade engineering specialties. These noiselessly operating machines have met with high favor through a wide field of applications, and much will be found in Bulletin 11a to interest the engineer.

The Radojet Air Pump. The design, care and operation of the Radojet air pump are fully described in a catalog issued by the C. H. Wheeler Manufacturing Company of Philadelphia, Pa. The principle upon which the Radojet is based is the removal of air by steam jets, and the apparatus is so simple, inexpensive and noiseless that it has been finding a wide use in marine power plants. A copy will be forwarded from 18th Street and Lehigh Avenue, Philadelphia, upon request to the C. H. Wheeler Manufacturing Company.

Over the Top, the weekly published by the employees of the Standifer

Construction Corporation, will be found of great interest. This publication is attractively gotten up and the matter will be found of interest to others outside of Standifer employees.

The Milburn Light is the title of an attractive catalog recently issued by the Alexander Milburn Company of 1420 West Baltimore Street, Baltimore, Md. The catalog contains descriptions of several new Milburn portable carbide lights, one of which, the "Reliance", seems to fill a long felt want. Complete directions are given for the economical use of these lights and several oxy-acetylene torches and generating units are also described. This company is manufacturing many of these light equipments for the use of the Government in France.

Steel Topsides. The second issue of this weekly issued by the employees of the Supple-Ballin Shipbuilding Corporation, contains an interesting account of the launching of that firm's sixth ship, the "Dalana", which was launched on May 18th. The number is interesting and well arranged and the editor, Mr. Frank J. Smith, is to be congratulated on the splendid showing he is making with this publication.

Heave Together. This is the title of the bi-monthly publication of the employees of the Northwest Steel Company, and furnishes an attractive and well edited review of the activities at this well known Portland shipyard.

The Inter Plant. A semi-monthly published by the Industrial Department of the Y. M. C. A., and devoted to constructive work in the shipyards of Portland. It details some of the work undertaken by the Y. M. C. A. organization in the local shipbuilding plants.

Japan. The June issue of "Japan" contains some interesting notes on the use of waterways in that Empire. Of special interest is the description of the cradle railroad which transports large barges over an elevation barrier of 160 feet. The number is both attractive and entertaining.

Classified Catalog. The 1918-1919 catalog of publications classified by subjects, issued by the Macmillan Company of New York, is now out and copies of this valuable book list may be secured on request.

Laying Off, a text book on the geometry of shipbuilding, by Edward L. Attwood, M. I. N. A., R. C. N. C., and I. C. G. Cooper, lecturer in naval architecture at Chatham; published by Longmans, Green & Co., Fourth Avenue and Thirtieth Street, New York, \$2.00 net. This work will be found of especial value to students of naval architecture, draughtsmen and others, whether their actual work takes them into the mould loft or not. All drawings used to amplify the text are made as simple as possible, and the lettering and markings on them are self-explanatory. At this time, when so much new human material is being drawn into our shipyards this handy work on laying off will be found very useful to a large number of embryo shipworkers, as well as those who are among the initiated.

How Wooden Ships are Built. By H. Cole Estep, editor of "The Marine Review", published by the Penton Publishing Company, Cleveland, Ohio.

Price \$2.00 net. This work has been issued in a highly attractive manner, being illustrated with no less than two hundred plans and illustrations, the photographs having been secured specially for use in this publication. The wooden ship is taken up more or less in detail, and the treatment is extremely practical, and together with detail drawings and photographs of the actual work in place gives the wooden shipyard worker a clear insight into the many problems which enter into the construction and fastenings of a wooden ship. The work is supplemented by two valuable chapters on "How Wooden Ships are Laid Off" by Samuel J. P. Thearle. Mr. H. Cole Estep's book on the wooden ship is sure to receive a hearty welcome, as it fills a long felt want, high class literature on the subject of wooden shipbuilding, being a rare article and the great expansion in the business during the past year or two creating a demand for knowledge on the modern application of what had almost become a lost art, the construction of large wooden ocean going hulls.

The Men on Deck. By Felix Riesenbergh, C. E., superintendent New York State Nautical School, published by D. Van Nostrand Company, 25 Park Place, New York. \$3.00 net. A complete and splendidly arranged manual setting forth the duties, rights, privileges and requirements of masters, mates, petty officers and seamen in the American merchant service. In these days when thousands of young Americans are accepting the sea as a calling temporarily, if not permanently, this manual, written by one who has commanded a school ship for many years, and created many hundreds of the officers who are guiding our merchant ships today, this work on the men on deck will be found of especially value. No phase of the subject is left untouched and a careful perusal of the book gives a clearly defined knowledge of the division of duties on board ship.

The Whys and Wherefores of Navigation. By Gershom Bradford, navigating officer and senior instructor New York State nautical schoolship "Newport", published by D. Van Nostrand Company, 25 Park Place, New York. Price \$2.00 net. In prefacing this work, the author sets forth that the volume is not intended to displace any of the excellent works on navigation now extant, but to serve as supplementary reading to such standard works as the American Practical Navigator by Bowditch. The "Whys and Wherefores" have been prepared for the practical navigator who performs his work mostly by rote and who is, perhaps, a little curious concerning the fundamentals lying back of his every-day actions. To such men, school ship graduates, masters and mates, this work will be found of exceeding interest.

Holmes Metallic Packings. This catalog describes the well known Holmes metallic packings, as manufactured by the Holmes Metallic Packing Company, Wilkes-Barre, Pennsylvania, and is illustrated by photographs and diagrams which fully describe the principles of metallic packing. A copy will be furnished on request.

FREE WIRELESS

Able business men do not spend much time trying to get something for nothing. Most of them know from experience that it can't be done and they make money for themselves and their companies by keeping away from that kind of business. And because they know that they can't get something for nothing, selling Cutting and Washington wireless is about as easy as selling ten dollar gold pieces for \$2.59. Why? Because Cutting and Washington wireless not only costs nothing but actually makes money for its owners—it's more than something for nothing—and looks too good to be true.

But once in a while we find another sort of man—one who weighs and considers and acts—the kind who never seems to work very hard but always makes money—the sort who knows about new things before the magazines start writing about them. Such a man is President I. M. Taylor of the East Coast Fisheries Company who tried out a Cutting and Washington set on the "Kingfisher" and is now equipping his whole fleet. The following paragraphs taken from the numerous newspaper articles published in Boston and Portland, Me., tell the story:

"Just as the President of the United States opens the world's exposition in whatever city it may be by pressing an electric button in Washington, so did President I. M. Taylor of the East Coast Fisheries Company formally usher in a new era in the fishing business of America Saturday afternoon when he sent a wireless message from the new steam beam trawler Kingfisher to Food Administrator Hoover, announcing that the first trawl had been pulled and the first catch of fish made fifteen miles off Portland on the maiden trip of the craft.

"The Kingfisher is the first of a fleet of eleven beam trawlers to be built for the East Coast Fisheries Company under intensely interested Government sanction. The vessel symbolizes all that is modern in the construction of vessels of her type. Designed by Cox & Stevens, naval architects of New York, she is said to embody all the best points of the British, Scottish and American beam trawlers thus far built.

"The income of the steam trawler is not obtained wholly from fish as a food. Some use is made of every part of the fish. There is a complete outfit on board for trying out the livers of the fish for oil, while the entrails are made into fertilizer, and by a recently discovered process, even the skins will be utilized, being made into a unique and fine grade of leather.

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"Still another source of income open to the steam trawler is the opportunity for salvage money for towing disabled vessels to port. The trawler is equipped with complete towing apparatus, and can succor large vessels just as well as the powerful ocean tugs and coast guard steamers. The Kingfisher, the first of her type to be thus equipped, carries a complete wireless outfit, and can respond to S. O. S. calls at any time with an operator always on duty. One European trawler recently made \$200,000 in salvage money on one trip without catching a single fish.

" 'What the harvester is to agriculture, what the locomotive is to transportation, the steam trawler is to the fishing industry,' says one authority. He continues, 'One steam trawler with twenty-two men does the work of six schooners and 135 men. With its giant net it drags the bottom where the groundfish are permanently feeding. It saves an enormous amount of time, because it is not subservient to the elements. It works through all kinds of weather, fair and foul, day and night. It harvests in a few hours 200,000 to 300,000 pounds of fish, and, with its high speed returns directly to market with the entire catch appetizingly fresh.' "

Of course, the newspapers haven't told the whole of this interesting story. They don't say that the Kingfisher is in constant touch with her home office and the market at all times, they don't say that the C. & W. set on this wooden boat works from 350 to 600 miles, nor that the expense of this C. & W. wireless set is less than one quarter of the cost of leased equipment, nor that no C. & W. set has ever broken down in service.

Cutting and Washington wireless has many points of superiority. It is sold outright and costs only about one-quarter as much to operate as the same size and quality of leased equipment. It is so rugged that service stations are not necessary to keep it in operation—the service is built in at the shops. The up-keep cost is negligible.

It is so simple and easy to operate that many owners are training the officers on their boats to operate the sets and thereby are saving the expense of operators. C. & W. sets have a very low gap voltage and a very high factor of safety. Anyone who knows the code can operate a C. & W. set and keep it in operation. There are *no* critical adjustments.

CUTTING & WASHINGTON, Inc.
1078 Little Building
Boston **Mass.**

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MEN IN UNIFORM ASK FOR NEW FICTION

"The soldiers persistently ask for new novels, which never seem to be part of the gift shipments," writes one camp librarian to the Library War Service Headquarters of the American Library Association.

"I find a special need among the patients for up-to-date reading matter," writes the chaplain of a base hospital. And from a hospital librarian comes an appeal for new fiction.

In the three million books given by the American people for camp library use, there are few 1918 novels.

It is true that old books, like old friends, are always welcome, but the new ones are wanted, too.

With vacation days at hand, many people will be buying recently published novels to read during the summer hours on boats, in camp, or at home.

As soon as these novels have been enjoyed by the buyer, it would be a kindness to pass them on to the soldiers, sailors and marines, who are eager for "that new book I saw advertised". Books taken to any public library will be forwarded promptly to camps and stations where they are needed.

The Columbian Rope Company, in line with their progressive policy, has recently established an employees' family newspaper; that is, a publication which circulates among all the employees of their plant. It is edited along the line of a big country newspaper, and is proving quite successful in increasing the good will of their employees. While this publication is intended primarily for circulation among their own employees, a letter addressed to the Advertising Department of the Columbian Rope Company will result in their sending a copy to any manufacturer who might be interested.

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"WHEELER-BALCKE COOLING TOWERS"

is the name of Bulletin 109-B, just published by the Wheeler Condenser & Engineering Company, Carteret, New Jersey. This twenty-eight page bulletin shows Wheeler-Balcke Cooling Towers of numerous designs, in capacities varying from a few thousand gallons per hour to nearly a million gallons per hour. It is shown better, in some cases, to combine natural and forced draft. Two pages are devoted to Wheeler-Barnard Forced Draft Cooling Towers, which are at times found preferable to the Wheeler-Balcke. Whenever sufficient ground area is available, however, the Wheeler-Balcke is usually considered by consulting engineers as the standard natural draft tower.

THE LILLIE EVAPORATOR FOR WASTE WATERS

The first booklet relating to the Lillie Evaporator, published by the Wheeler Condenser & Engineering Company, Carteret, N. J., is just off the press. The Lillie Evaporator is now manufactured exclusively by this company under agreement with the Sugar Apparatus Manufacturing Company, S. Morris Lillie, president, owner of the Lillie patents.

This new booklet calls attention to the factors which make the Lillie Multiple Effect Vapor Reversing Evapo-

rator especially suited to the concentration of waste waters or liquors in numerous industries. Waste waters are often very dilute, and the valuable solids form but a small per cent of their substance. Some of these products have abnormally high values during these war times, and economy of evaporation is not of so great moment. But in normal times financial success or failure may depend largely upon economy of evaporation, and it kept in mind. The booklet discusses the normal condition that should be the "Economy Possibilities" of the Lillie Evaporator, explains the method of "Film Evaporation", discusses the effect of the Lillie Multiple Effect in bringing solutions to "High Densities", explains why "delicate" solutions are less susceptible to injury by heat in the Lillie Evaporator, tells how the vapor-reversing feature reduces "Incrustation Troubles" to the minimum, refers to the economical "Distillation" of water, and lastly mentions some of the solutions that are not waste waters, but which are successfully handled by Lillie Multiple Effects. Five pages of the booklet are devoted to tables that are of especial value in the evaporation industry. An accordion folding page insert gives the principal instructions for operating Lillie Quadruple Effects.

1480 RIVETS IN FOUR HOURS

Peerless No. 4810 air hose was used in a remarkable record at driving rivets made under handicap at the Morse Dry Dock & Repair Company's plant in South Brooklyn, recently.

Bertram Bieher, riveter, and his holder-on, Eddie Hesse, with four heater boys drove 1480 regulation size three-quarter inch button-head rivets in four hours and ten minutes.

As the men were forced to travel thirty-four feet for every eighteen rivets driven and worked on girdons on which the rivets were twelve inches apart, the conditions were considered unusually trying in shipbuilding plant circles. Despite the handicap the men worked faster each hour until ten minutes before completing the job.

352 rivets were driven the first hour.
360 rivets were driven the second hour.

361 rivets were driven the third hour.

362 rivets were driven the fourth hour.

45 rivets were driven the last ten minutes.

For a record of this kind it is obvious that air hose plays an important part in rivet driving. It would not do to have to stop to make repairs.

Peerless No. 4810 air hose, made by the United States Rubber Company, is a well constructed hose that will not kink, is non-leakable and impervious to the action of oil.



A. J. MORSE & SON, Inc.

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221 HIGH ST. Boston, Mass.

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WHITING-ADAMS BRUSHES

Several Reasons for Buying WHITING-ADAMS Vulcan Rubber Cemented Brushes

1st. The bristles and hair are highest grade, prepared for use by the WHITING-ADAMS method, which retains toughness, elasticity and a velvet softness of ends. This makes the part of a brush that is used, perfect in quality and long wearing.

2nd. Every bristle and hair is held by pure, best quality Rubber; no fake, coal tar, chemical imitation of rubber is used in our factory. "Rubber" means pure rubber in all WHITING-ADAMS Vulcan Rubber Cemented Brushes. The butts of bristles or hair are completely saturated and surrounded with strictly pure rubber in semi-liquid state, and then vulcanized hard as granite.

3rd. WHITING-ADAMS Brushes cost little and wear long. Our large volume of business reduces cost of manufacture to lowest point, and selling prices are made near to cost.

4th. Manufacturing Brushes as we have for over 106 years, means that we know brushes, and users of our brushes receive the full benefit of our brush knowledge.

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BOSTON, U. S. A.

Whiting-Adams Brushes Awarded Gold Medal and Official Blue Ribbon, the Highest Award at Panama-Pacific Exposition, 1915.



Yale Spur-gear Block handling Plates in shipyard

"Speeding up"—and Yale Spur-gear Blocks

Everywhere the great national cry is speed—speed—speed. Ships, aeroplanes, guns, munitions—all demand haste. *They must have priority.*

Yale Spur-gear Blocks are helping build Uncle Sam's great merchant fleet. They are part of the equipment of every vessel where safe, dependable hoisting apparatus must be ready for every emergency.

No ship's equipment is complete that does not include Yale Hoists to handle every load—light or heavy.

Yale Spur-gear Blocks are designed, built and tested on the basis of quality: to stand the 50 per cent overload test of 3360 pounds to the rated ton. The guarantee is in the block itself.

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For factory locking equipment use a Yale
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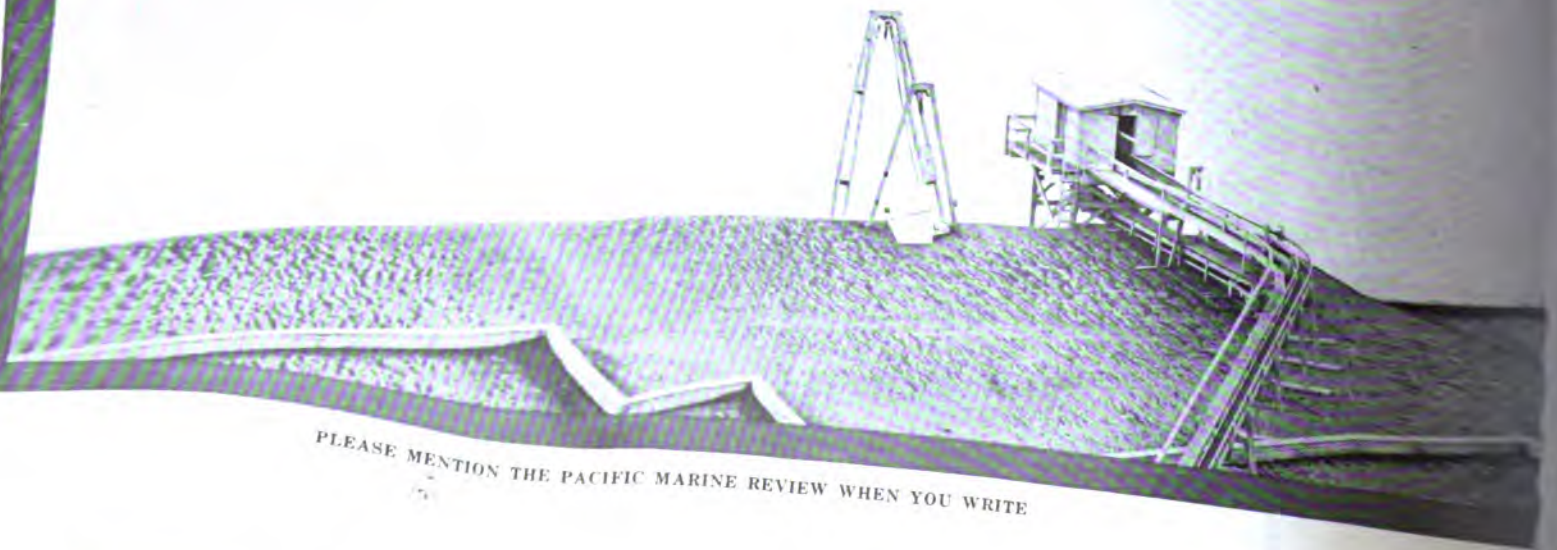
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Pacific Marine Review



August 1918
25 cents



SAN FRANCISCO



NEW YORK

A Simple Plan That Works

FOR the manufacturer, the difficulty of obtaining important supplies under abnormal conditions does not lessen as time goes on.

If he does his share in maintaining Linde Service, he is able to meet these conditions as regards one highly important item—Oxygen.

The matter of promptly returning empty cylinders is becoming one of increasing importance. Not all manufacturers appreciate how particularly vital it is in times like these.

Some of the largest consumers of Oxygen make use of a very simple system that enables them to tell at a glance the daily oxygen consumption, whether more should be ordered, and how many empty cylinders are waiting to be returned.

Manufacturers now paying a rental charge for cylinders could, by adopting such a simple system, save money.

If you care to see the details of the plan, we will gladly send them on request. A plan that is helping others may very well help you.

The Linde organization from coast to coast has never been so well equipped to render the intelligent service which is the ambition of everyone in our employ, but Linde Service with its hundreds of thousands of cylinders demands your cooperation.

Help us to help you by returning the empties promptly.

The Linde Air Products Company

The Largest Manufacturers of Oxygen in the World
42nd Street Bldg., New York City





WE are building ships. We are doing the best we can, and we are going to do still better in the future. This is the Pacific Coast's attitude towards the Nation's great need, and this attitude had reached such a stage of fulfillment that we were proud to welcome Charles M. Schwab and Charles Piez to the Pacific Coast. We are measuring up to their requirements of us, and if the Pacific Coast had not one other single thing to show in the measure of her contributions towards the great struggle for the freedom of the world, her shipbuilding alone would enable her to hold her head high among all peoples. But the end is not yet, for in our shipbuilding records, as in our other achievements, we shall not rest upon our past laurels. We shall strive forward mightily with a full consciousness of the gravity of our task, and if, in the end, we shall hear that portion of the world which is dedicated to decency murmur "well done," we shall feel that we have striven honestly and well in a righteous cause.



Mr. Charles M. Schwab.

Copyrighted Bushnell Studio.

PACIFIC MARINE REVIEW

August, 1918

Copyright, 1918, by J. S. Hines

The Highest Esteem of the Pacific Coast Is His

JOHN RUSKIN has said that it is far more difficult to be simple than to be complicated and it is this kind of simplicity which has enabled Charles Schwab to become a great national figure. His open and direct manner of carrying on the great work which has been entrusted to him, and his honest and ardent desire that due credit be given those who are assisting him have combined to open a pathway for "Charlie" Schwab straight into the confidence and esteem of the American people.

Mr. Schwab's visit to the Pacific Coast has already been productive of much good. It has made for a better understanding between employee and employer, it has already affected output favorably and when it is considered what the West has already accomplished in shipbuilding this is speaking volumes.

Not so many months ago the Shipping Board was being censored to quite a considerable extent throughout the length and breadth of the land and at that time we made the prediction that everything would come out all right, that the board was facing the most gigantic task in history and that it must be given time to find itself. Since that time the affairs of the Emergency Fleet Corporation and the Shipping Board have been shaped into a cohesive working unit. Vast expansions have been made in the country's shipbuilding facilities, great multitudes of men have been trained in the shipbuilding trades and production has advanced month by month until it is now well over the 3,000,000 tons a year rate. In short, the Shipping Board has found itself and the final act which placed that body in its present highly efficient condition was the impressment into its service of Charles M. Schwab.

From Seattle on the North to San Diego on the South, the tour of the Schwab party on the Coast has met with results that cannot help but inspire confidence. We all know that the country must have ships, ships and yet more ships and we knew this before Mr. Schwab's visit among us, but we now have the added confidence that all our efforts to produce these ships are being expended in the right direction, that there is no lost motion and that not one iota of the shipbuilder's labor shall be expended unwisely. With this conviction firmly fixed in our minds is it any wonder that "Charlie" Schwab's plea for even more strenuous work is meeting with an instant and hearty response.

The Shipping Board has immeasurably strengthened its position with the public by all of its recent appointments to positions of great responsi-

bility and high trust and its operating and construction departments are headed by men who not only enable us to look upon the present with satisfaction and trust but also to look forward into the future without fear or misgivings, for the men who are so ably creating and operating our rapidly expanding fleet may be trusted to see that it is maintained and used for the fullest benefit of the entire country when peace has settled upon the world once more.

"I AM aching and dying to get back East and tell the men back there what I have seen out here with my own eyes of what you are doing in building ships here."

Thus did Mr. Schwab voice his appreciation of what the West is doing.

"When I was asked to undertake this work I said there were two things that would help tremendously in producing ships—enthusiasm and competition. We found that the men had the enthusiasm and now we have the competition. Admiral Fletcher was placed at the head of a board to keep check on what the different shipyards are doing and to decide each month which yards were entitled to the honor of a special award for the work accomplished. While on our way here we received a telegram saying that the six flags for the month of May were all won by the Pacific Coast and that two of them came to the Pacific Northwest.

"During the past sixty days we have been turning out ships at a rate equal to the production of one 10,000 ton boat every day. We must go on and on and on; we must build ships and ships and ships, for we need a tremendous amount of ships after the war to gain and maintain the commerce to which America is entitled. And I don't want you to get the impression that we are going to have a little war that doesn't call for the best you have, and we have got to go to it with a spirit that we have nothing else that is worth our attention except to win the war.

"This flag of ours has never gone into an unjust war; it never will. It never has been defeated and it never shall be. There are no longer doctors, or lawyers, or preachers. We are all just plain Americans, giving all there is in us to win the war.

"Money doesn't bring comfort. Riches bring only responsibility and sometimes the ability to do something foolish. I am going to tell you that there is nothing worth while in this world but the consciousness of duty well performed."



Panorama of the yard of the Seattle-North Pacific Shipbuilding Company, May 13, 1918, showing airdials, winchman station towers and ways ready for keel laying.

Rapid Progress in New Yard

WORK at the Seattle plant of the Seattle-North Pacific Shipbuilding Company has been progressing remarkably well and the site, which only a few short months ago was partially under water, has been developed at such a rapid rate that it is now occupied by one of the most modern shipbuilding plants on the Pacific Coast.

From the accompanying photographs it will be seen that this yard is rapidly hitting its stride in steel fabrication, making remarkable progress despite the fact that construction work on the plant itself is still under way. The plant work will practically be all completed by the middle of the present month, very much to the gratification and credit of General Manager J. E. Sheedy. In fact, on their recent visit, both Mr. Charles Schwab and Mr. Charles Piez of the United States Shipping Board expressed their warm approval of the splendid progress achieved by the Seattle-North Pacific Shipbuilding Company in such a short space of time.

In planning the yard layout, a vast amount of careful consideration has been given to the problem of efficient material handling. The steel storage yard is immediately adjacent to the plate shop

and punch sheds and plates and shapes are handled directly into these buildings by a series of long-boomed whirlers which cover a large storage area. In the plate and punch sheds the overhead service is very complete and this is augmented by efficient feed tables for handling the work into the punches.

Over the building berths the handling is taken care of by an aerial system similar to the many installations of this kind now in operation on the Pacific Coast. These various systems of handling are supplemented by a complete system of broad gauge tracks on which are operated several locomotive cranes.

The plant of the Seattle-North Pacific Shipbuilding Company is located on some 31 acres along the West Waterway, Seattle. The principal building is the punch shop, which is 160 by 370 feet in dimensions. The layout shop, 50 by 450 feet in extent, is served by two bridge cranes. Plate storage is taken care of back of these buildings by three stiff leg derricks, each having an 80-foot beam swinging a complete circle, and thus covering a large amount of storage space. The punch shop is fitted out with batteries of the most modern punches, shears and rolls, all with independent electric drives. The angle shop is located in the south bay

of the punch shop and the next bay contains a battery of modern oil-fired angle furnaces and a large extent of bending slab. In connection with the punch shed, each bay is served by a bridge crane and the entire shop has been designed with a view to speeding up production to the last notch.

The punching machines are all served by Lysholm spacing tables, an arrangement which enables one man to do the work of four on an ordinary punch without mechanical aids for feeding the work. The assembling tables are served by overhead bridge cranes, which run the entire length of the punch shop and are carried out beyond the end of the building for a hundred feet.



The site of the big shipbuilding plant. Photograph taken on April 10, 1918.

The mold loft is a two-story building covering 80 feet by 336 feet and situated just north of No. 1 way. This loft is extremely well lighted and has been pronounced one of the best layout floors in the Northwest. The ground floor of this building is utilized as a pattern shop, joiner shop, electrical shop, and also contains offices for yard superintendents and Government or private inspectors. The tool equipment in the pattern and joiner shops has been very carefully chosen and gives the plant a splendid wood-working department.

There are five building ways at Seattle's latest shipbuilding plant, each 470 feet in length by 80 feet in width.

There is a machine shop, 80 by 400 feet in size, fitted with modern tools, including many special tools for turbine work.

The fitting out wharf is fitted with a 75-ton shear legs derrick and has sufficient berthing capacity for two large steamers at one time.

The power house is located at the south end of the punch shed, and here will be found a battery of modern air compressors and provision for expansion of this branch of the power service to an ultimate capacity of 15,000 cubic feet of free air per minute. Here also are located transformers and switchboard control for the different voltage systems used throughout the yard, all tools, cranes, etc., being electrically driven by individual motors. High pressure from pumps form another part of the power house equipment and feed a piping system which affords ample protection to all parts of the works.

There are fifteen hundred men employed at the Seattle-North Pacific Shipbuilding Company's plant at the present time, and, although the plant has been handicapped by the lack of machinery, it has



The yard on June 10, 1918, keels laid and shipbuilding operations well under way.

been putting the work out with machines that have been rigged up on the premises to perform the necessary operations. The boys in the yard have been "hitting the ball" in grand style, and special credit is due to Superintendent of Hulls Thomas Nielsen and Superintendent of Machinery M. Black, both of whom have been untiring in their efforts to increase efficiency. During the past few weeks the store room, pipe room, copper and sheet metal shops and timekeepers' office have all been finished, equipped and occupied and a few weeks more will witness the final completion of Seattle's latest shipbuilding establishment.

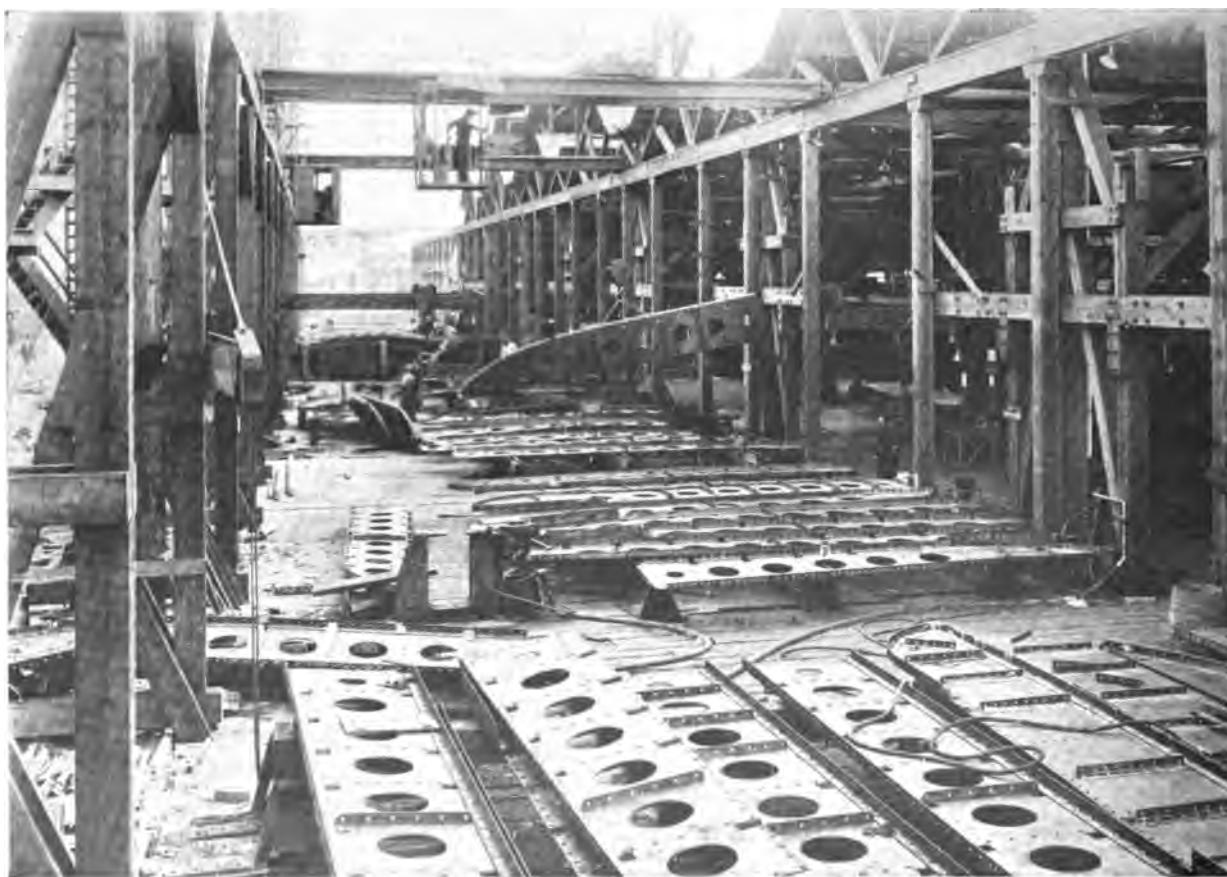
While the plant of the Seattle-North Pacific Company is the newest shipbuilding unit in the Puget Sound district, a fact which might be interpreted as presaging a difficulty in securing labor, a study of the progress pictures shown with this article will show that the concern has made remarkable progress for a yard working on its first contracts. There is every reason to believe that this plant will take a prominent place in a district which already has many records to its credit.



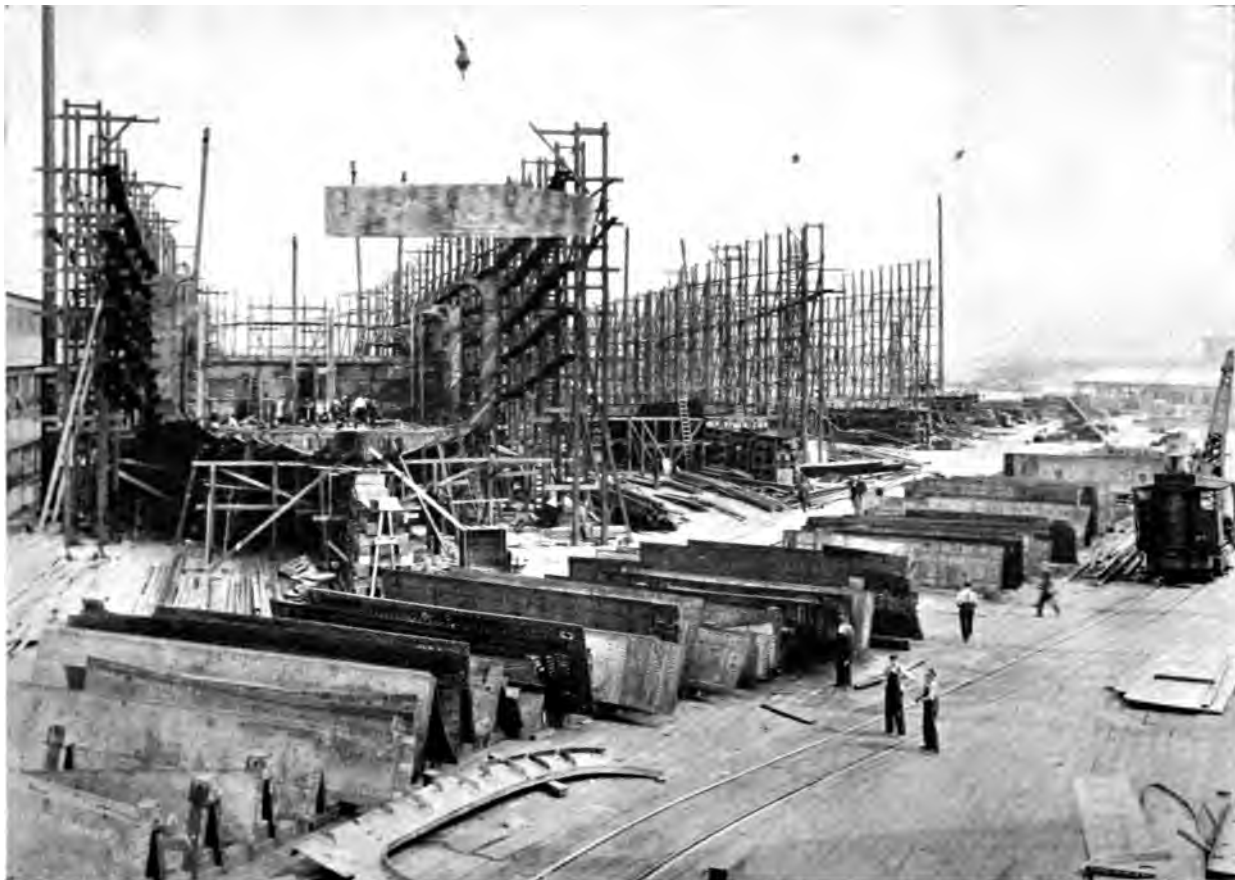
Upper end of storage yard showing battery of gib cranes used for handling material.



View through one of the bays of the punch shed showing the use of Lysholm spacing tables for feeding the machines.



Assembly bay with overhead travellers assembling floors for vessels starting on the stocks.



View taken from the shore end of the building ways twenty-six days after the first keel was laid. This shows splendid progress for a new yard working on its first contracts.



Work is laid out for the plate shop in a separate laying out bay where every effort has been made to get fine lighting and rapid handling into the machines so that no time is lost.



The old plant of the Winslow Marine Railway and Shipbuilding Company, at one time the famous Hall Brothers yard, has undergone a vast amount of improvement under the ownership of D. W. Hartzell, Inc.

Famous Old Shipyard Remodeled

UNDER the guidance of D. W. Hartzell, Inc., the plant of the Winslow Marine Railway and Shipbuilding Company, formerly the famous Hall Brothers' yard, is undergoing vast improvements and additions. This work will perpetuate one of the most noted wooden shipbuilding yards on the Pacific Coast and serve to connect up present shipyard activities with the efforts of the past masters in the art of wooden ship construction.

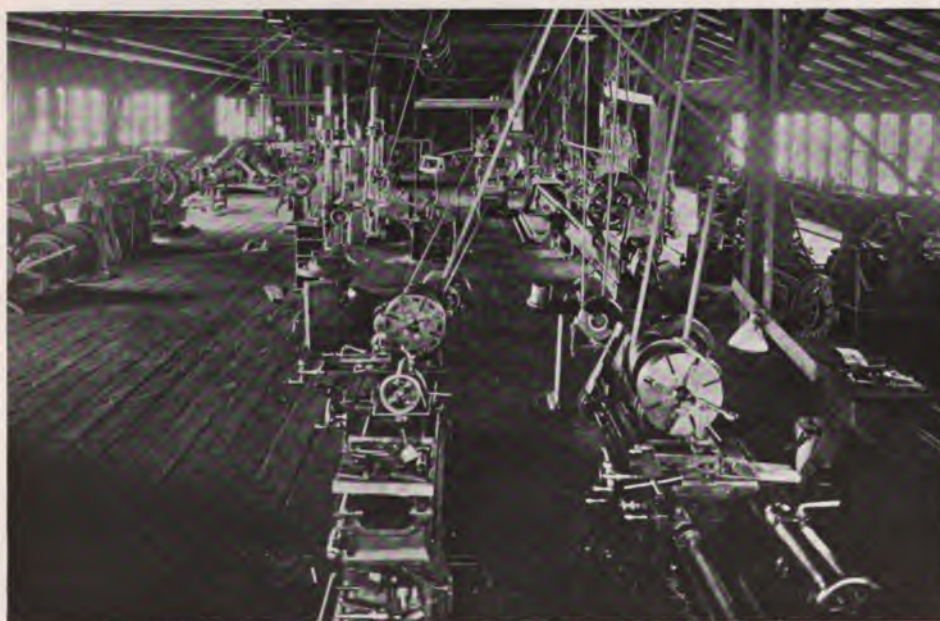
The firm of Hall Brothers was started in San Francisco in 1872, although the shipbuilding history of the Hall family antedated that year by several decades. The Hall brothers established a yard at Port Ludlow, Washington, and by 1896 had constructed a fleet of eighty-three sea-going vessels, all of which were known far and wide for their graceful lines and the fine character of their workmanship. In 1882 the firm moved to Port Blakely,

and in 1902 to the present location of the plant at Winslow, Washington, the firm name becoming Hall Brothers Marine Railway and Shipbuilding Company. The site consisted of ninety acres on the north shore of Eagle Harbor, with a half mile of water front. This was an ideal site, as it is thoroughly protected from heavy weather at all seasons of the year. In June, 1916, the business of the old firm was taken over by the Winslow Marine Railway and Shipbuilding Company and later passed into the control of D. W. Hartzell.

While the plant was well equipped with machine shops for steel repairs, tail shaft work and engine fitting, complete electric light system, forge and boiler shops, saw mill, joiner shop and shear legs, it can only be regarded as a nucleus for the present plant. All of the old outfitting docks have been completely rebuilt with new piling and decking and an equal amount of new outfitting dock space has been added, so that the capacity of the old plant is more than doubled and at present six large ships can be handled at any one time.

Through the assistance of the Priorities Board in Washington, new iron chains were secured for the old marine railway, which is of the Crandall type, having a steel cradle 325 feet in length, making it possible now to handle a ship of 4,000 tons deadweight without difficulty.

The small marine railway, which had been practically abandoned, was reconstructed and a new cradle installed. This marine railway enables the firm to take care of Puget Sound craft of all descriptions up to 500 tons deadweight.



A corner in the machine shop at the shipyard of D. W. Hartzell, Inc.



As will be seen from this panorama, the yard has a splendid stretch of waterfront and is well equipped with shops and fitting out docks, placing the plant in an enviable position as a repair yard.

A new office building has been built on the property which assures adequate space and facilities for the proper accounting and carrying on of the firm's business affairs. A Hollerith accounting machine is being installed in this building, and it is interesting to note that this is the first time that one of these machines has been used in a shipyard. It is expected by this means that an accurate accounting can be secured on a few hours' notice at any stage of a job while it is in progress towards completion.

New and splendidly equipped pipe and copper-smith shops have been added to the general equipment of the plant, while all of the old machines, boilers, engines, etc., have been completely overhauled. The plant is fitted with shear legs on one of the outfitting docks, having a capacity of 35 tons, and a McMyler locomotive crane is used for handling material throughout the yard, there being a complete system of broad gauge tracking tapping all parts of the property. Enclosed storage sheds have been constructed for storing the material and equipment.

The ship ways are vacant at the present time, but with the large mold loft and saw mill equipment it is momentarily expected that contracts will be secured for the construction of large barges, scows, etc., which will serve to furnish steady employment to the many ship carpenters who have their homes in this neighborhood.

A contract has been recently secured from the Emergency Fleet Corporation for the installation of the machinery in ten of the wooden hulls under construction by Messrs. Sanderson and Porter and the delivery of the first hull at the yard is expected within a week or two.

Mr. F. F. Sinks is general manager of the property and has direct charge of the entire organization, while Mr. Arthur Jones, one of the most widely known ship repair men in the country, is general superintendent in charge of ship repairs and machinery installations.

With modern and efficient machinery and a capable, up-to-date organization, this firm is perhaps as well equipped to handle repair work as any yard on the Pacific Coast.

MR. CHARLES PIEZ

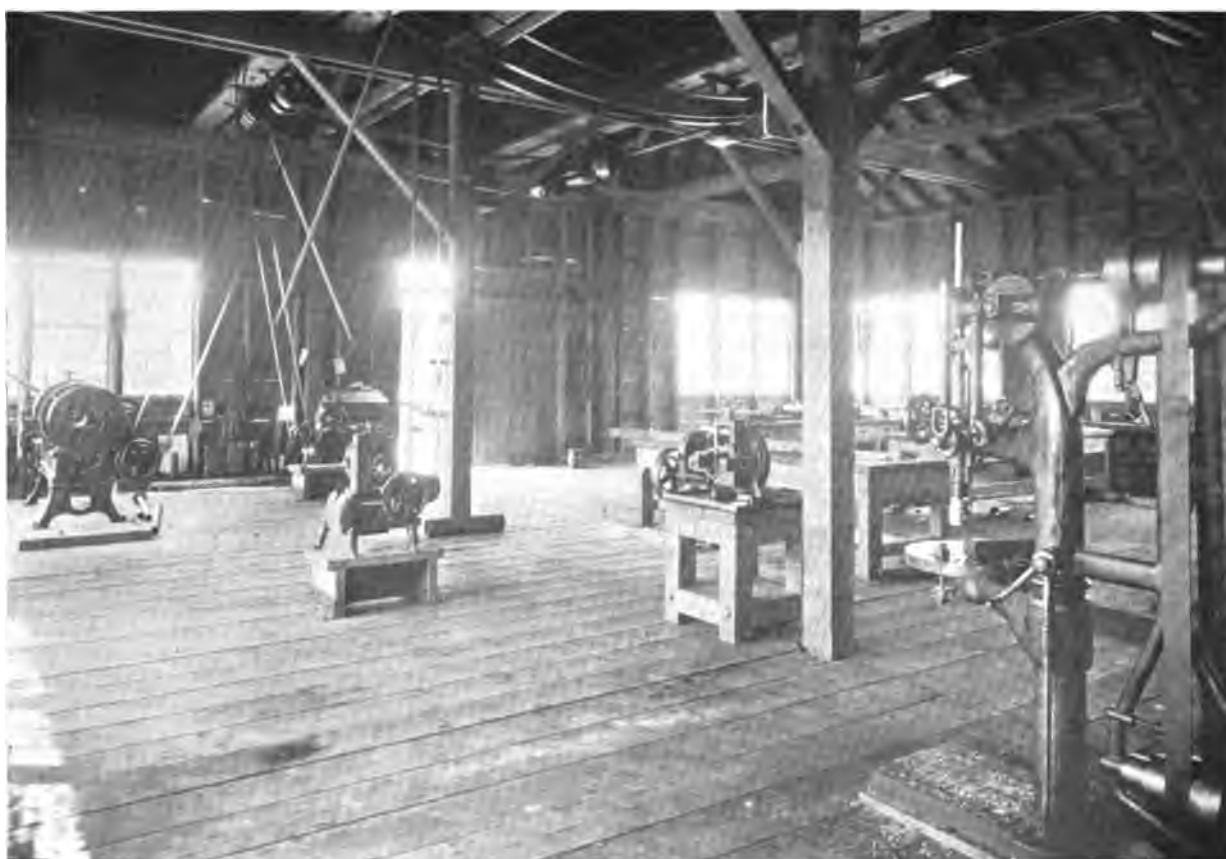
In his tour of the Pacific Coast shipyards with Mr. Charles M. Schwab, Mr. Charles Piez proved a very welcome visitor. As president of the Link Belt Company, Mr. Piez won a great reputation as an efficiency man and organizer and his direct approach at problems presented to him and his frank comments on conditions has led to his being accepted up and down the Coast as a really big man. In short, Mr. Piez is on the job every minute and that appeals strongly to Americans these days.



Charles A. Piez, vice-president of the Emergency Fleet Corporation.



View of the marine railway and one of the fitting out docks at the plant of D. W. Hartzell, Inc., Winslow, Washington.



A section of the pipe shop in the Hartzell plant showing pipe cutting and threading machines and the extensive floor space available for bending work.



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BEAR THE FREE PORT QUESTION IN MIND

IN the various efforts towards proper co-ordination of port facilities at San Francisco now being made, nothing should be allowed to detract attention from the free port question. In the recent report of the committee on free port of the San Francisco Chamber of Commerce, the advantageous points in connection with the city's location and local surroundings were ably set forth, as well as a hint of the advantages to be gained by the community through the establishment of a free port zone. In this connection we quote the document, as follows:

"The trans-shipment business of the world runs annually into billions of dollars. Good authority makes the figure over four billions. Up to the world war much the greater part was done in free ports. It is well worth the effort to get our share.

"Comparatively but a very small proportion of America's present trade with foreign nations comes under this head, but its growing importance has been made more and more manifest by the developments and changes due to the present war.

"That business in the Occident has heretofore centered in the neighborhood of the British Channel and the North Sea, and in the Orient at Singapore and Hongkong.

"If American ports want to compete successfully with European and Asiatic ports in this rich sphere of trade, we will be handicapped in the race just in so far as that trade is artificially hindered by the manner and method of the enforcement of the customs laws. Nothing is here said or intended for or against either a high or low tariff or for or against a protective or revenue system of tariff taxes. We mean to confine ourselves solely to the manner and method of enforcing the collection of the tariff taxes, whatever be the particular policy in force, as to the kind or amount of the customs

dues. We are familiar with and know from experience the costs, delays, vexations and losses due to customs red-tape and supervision. They are, we believe, a very serious impediment to the re-export trade and foreign commerce generally. If removed, the gain will be enormous. If they can be removed by the simple process of putting the customs house and its red-tape wholly outside the 'free zone' or 'free port', without any loss to the government in revenue, without any increase in the cost of collecting the taxes and without any greater risk of smuggling, surely nothing remains of the argument, except the single question as to whether in the older ports the change can be effected without too great a cost for the physical constructions or re-arrangements necessary to install the free port system. In the newer ports, where there is much virgin territory to work on, of course this part of the problem is of easier solution. In the latter aspect, it is proper to point out that on San Francisco Bay the present situation lends itself admirably to the proposed change. It would be idle to go too deeply into that question at this time. If the policy be a wise one nationally, the natural advantages above adverted to, an inspection of San Francisco Harbor on both sides of the Bay of San Francisco, a consideration of the commercial propensities and aptitude of our people, the evidence furnished by immense recent outlays for harbor improvements and the superior facilities now available, all combined demonstrate the justness of the conclusion that San Francisco Bay is an ideal site for a 'free port.'

"This conclusion should be constantly borne in mind by those working for the betterment of our waterfront system. Any general warehousing and cargo handling scheme adopted for the waterfront should be based definitely on the possibility of the 'free port' zone becoming an actuality. If the free port does come, there is no reason why any improvements now undertaken should not be carried out in such a manner that they will fit snugly into the new scheme of things."

ATTENTION FOR OUR HARBOR

WHEN one considers the method adopted for governing the waterfront of San Francisco, he will be forced to admit that the results have been remarkable. If, however, the waterfront is considered as a working unit per se, the results have not been altogether satisfactory. Where a harbor commission is appointed by the Governor of a State, the result is usually either a political board, a board lacking knowledge of the business in hand, or both. Some of the boards of harbor commissioners in charge of San Francisco's harbor made an honest effort to administer their trusts to the best of their ability, others operated from a purely political standpoint. When these facts are considered, and also when it is realized that the law under which the Harbor Commission is appointed expressly provides that no member of the board shall know anything about shipping or harbor matters, what has really been accomplished on the front is little short of remarkable.

During the past few months a great deal of public interest has been aroused in San Francisco's waterfront problems. This interest has been stimulated by the investigations carried on by committees of the Chamber of Commerce and through articles in the daily press, and people are asking

themselves what it is that is wrong with the waterfront. The answer is that as a terminal unit the San Francisco waterfront is incomplete. Furnished with a splendid system of wharves and docks, we lack the essentials necessary to bring these wharves and docks up to their full efficiency. The answer to the problem lies in the fuller utilization of the present water front rather than its extension.

The efficiency of a dock or wharf varies directly with the speed with which commodities are moved over it and just as long as all commodities are moved by hand the efficiency of the wharf will remain at a low level. Again if the functions of the transit shed on a wharf become confounded with the functions of a warehouse, the result is stagnation.

Handling machinery is the crying need on San Francisco's waterfront today. It must not be inferred, however, that all that is necessary is the installation of a few carriers for transporting goods from the transit sheds on the wharves to adjacent warehouses. The mechanical handling of diversified freight is an exceedingly difficult one as compared to the handling of such bulk freights as grains, ores or coal. An adequate warehouse system back of the wharves and cargo handling facilities which will make the structures on the wharves transit sheds in fact as well as in name, is what San Francisco needs today. As to shear legs and a hoist for handling heavy weights, this is not a problem, as its installation is a simple matter and its cost will not be excessive.

The present study of San Francisco's waterfront problems should be productive of much good, as the present Board of Harbor Commissioners are frankly and openly co-operating with the various committees representing the city and Chamber of Commerce, and development plans will be formulated which will adequately meet the situation.

A COMMENDABLE APPOINTMENT

Satisfaction at the appointment of J. H. Rosseter as director of the department of operations of the Shipping Board, succeeding Edward F. Carry, who becomes chairman of the Port and Harbor Commission, is by no means confined to the Pacific Coast, where the news was acclaimed with genuine enthusiasm. The following extract from the Marine Journal of New York is indicative of the general trend of comment throughout the East:

"Another able, practical shipowner has been drawn into the service of the government in the appointment of J. H. Rosseter as director of the department of operations of the Shipping Board, succeeding Edward F. Carry, who becomes chairman of the Port and Harbor Commission. Mr. Rosseter has been the vice-president and general manager of the Pacific Mail Steamship Company, and has had a very successful career in the seaborne trade of the Pacific Ocean. He is thoroughly familiar with international shipping conditions, and is particularly well acquainted with the commerce of the Orient. It was Mr. Rosseter who, twenty years ago, was chiefly instrumental in establishing the first regular steamship service between San Francisco and Pacific ports and the

west coast of South America. It is said of Mr. Rosseter that he was 'virtually drafted into the government service by the Shipping Board,' because his experience and abilities were so highly regarded. He will devote all his time to the service of the government, severing his present steamship connections.

"Chairman Hurley and his colleagues please the country greatly by every such appointment as this, of which the selection of Mr. Schwab is a notable example. We do not know Mr. Rosseter's politics—that is really a matter of little account. But of very high consequence is the fact that a strong, practical shipping man is put at the head of the bureau of operations, where his knowledge will be of the utmost value to the merchants and shipowners of our country and to the nation itself. More and more, steadily through the months, the policy of the Shipping Board in matters like these, is indicative of high ambition and sterling practical sense. It is not without reason that the recent appropriations asked for by the Shipping Board were granted by Congress without a word of adverse criticism."

SAFETY AT SEA

IN these days of war and the saddening and sobering influence of daily casualty lists, it is a pleasure to note the record made for the past year by passenger boats. Out of a total of over 300,000,000 passengers carried in vessels coming under the jurisdiction of the United States Steamboat Inspection Service only 71 lost their lives. This low figure has occurred for several successive years and bears eloquent testimony to the safety of travel by sea. The low loss rate on passenger vessels is a matter for congratulations both to the inspection service and the steamboat operators. There is no mode of travel nearly as safe as by water, and a study of statistics will readily explain why a passenger at sea in a storm may say with reason, "God help the poor devil on shore tonight."

HANDLING HEAVY WEIGHTS ON THE WATERFRONT

THE harbor facilities controlled by the Board of Harbor Commissioners at San Francisco do not include any facilities for handling such heavy weights as boilers, marine engines, cars, heavy machinery, or, in fact, any weights which are beyond the capacity of the ordinary ship's tackle. This lack on our waterfront has often been seriously criticised, especially since Seattle has provided such gear on one of her municipally-owned piers.

The location of shear legs or a crane for heavy handling on some particular wharf along the city front would be open to serious objection, however. It would often be necessary to shift a large vessel to hoist a locomotive on board and then shift her back to the wharf from whence she came to finish her loading. This would be an expensive proposition both in money and time, and it is an open question whether a heavy floating crane which could be moved along the front wherever needed would not be a far more profitable piece of equipment for the harbor to own.



Another Fourth of July Contribution

AS a contribution to the great Fourth of July launching program, the Meacham & Babcock Shipbuilding Company of Seattle launched two Ferris type steamers, the "Daca" and the "Wayucan," while still another Ferris type steamer was launched on July 27. The yard also owns the distinction of launching the first Ferris type steamer in Seattle, the "Boulton," she taking the water on May 18.

An interesting feature of the double launching on July Fourth at the Meacham & Babcock plant was that the day marked the first anniversary of the founding of the yard. During the launching ceremonies a telegram was received from Edward H. Hurley, chairman of the Shipping Board, which aroused great enthusiasm, the message reading as follows:

"Our historic launching today is a new Declaration of Independence. The big splash will go round the world. Your yard helped make it. Your employees are behind Pershing's men. Behind the faith of France. Behind the dogged courage of England. Behind the vim of Italy. Thanks and hearty good wishes from Mr. Schwab and myself. Let us all go back Friday morning to work for greater records."

The Meacham & Babcock plant is one of the most modern and complete wooden shipbuilding establishments in the Northwest. Modern machinery and handling mechanism have been installed in every department and the yard has expanded rapidly, the original ground lease of the company having been extended four times until at present all the twenty-two acres available for shipbuilding purposes at the Salmon Bay Terminal.

The engineers of the Meacham & Babcock Ship-

building Company found themselves handicapped by their inability to secure yard equipment on several occasions and promptly supplied the lack by designing and constructing contrivances of their own, thus avoiding all delay incident to the condition of the machinery market.

The plant has six building ways served by three large gantry cranes arranged so that each crane serves two ways. The wood-working machinery equipment is very complete and a large machine shop takes care of tool repairs and the necessary metal work in connection with the wooden hulls and their outfitting. A powerful shear-leg derrick has been erected on the outfitting wharf for the purpose of hoisting engines, boilers or other heavy weights into the vessels.

An unusual feature of the Meacham & Babcock plant is a canal running under the planked floor of the yard for seven hundred feet and used for transporting heavy timbers into the sawmill. This gives the yard somewhat of a metropolitan aspect, there being three levels for transportation of material, the gantries overhead, trucks and cars on the surface and the canal under the yard floor.

The concern holds contracts for ten steamers of the Ferris type, 281 feet 6 inches long, 46 feet beam, 26 feet moulded depth, 3500 tons dead-weight capacity and powered with 1400 horsepower triple expansion engines.

The yard employs some 1200 men at the present time and the organization is headed by W. M. Meacham, president; Otto A. Case, vice-president; L. E. Meacham, secretary; H. G. Babcock, treasurer; George R. E. Monk, superintendent, and James E. Bradford, general counsel.

"And Yet More Ships!"

IN September, 1917, The Foundation Company started operations on the tide flats just outside of Tacoma, Washington. On November 5 the first keel was laid and work started on the construction of twenty auxiliary schooners for the French government.

These boats are approximately 3,000 tons dead-weight capacity, contain two reciprocating steam engines with a total capacity of 750 horse power, using water tube boilers with coal for fuel, and have developed an average speed in excess of ten and one-half knots on their trial trips.

At this writing, four boats have been completely equipped and delivered to the agents of the French government. The remaining sixteen, it is anticipated, will be delivered approximately at the rate of one every ten days.

The yard employs approximately two thousand men and is one of three operated by The Foundation Company on the Pacific Coast, the other two being at Victoria, B. C., and Portland, respectively.

The Foundation Company is a New York organization which first came to the Coast for the purpose of shipbuilding in July, 1917. It now has three ship yards in operation on the Pacific Coast, building 45 wooden ships, and an organization of approximately 7,500 men.

The personnel of The Foundation Company is as follows: Mr. Franklin Remington, president; Mr. John W. Doty, vice-president and general manager; Mr. C. A. D. Bayley, vice-president in charge of shipbuilding. The Pacific Coast operations of the company are in charge of Mr. Bayley Hipkins as Pacific Coast manager; F. W. Drury, assistant manager, and J. E. McCormick, assistant secretary and treasurer.

The property comprising the Tacoma plant of The Foundation Company faces on two parallel waterways and the ground was built up from six feet below the high tide level. The building ways, ten in number, were laid out facing the Hylabos waterway on a spacing of 78 feet centers and a cant of three-quarters of an inch to the foot. These ways are served by ten gantrys fastened together and anchored to concrete anchorages. The crane masts are 100 feet high, 3 feet in diameter at the butt and 24 inches at the head. This mast carries a boom 80 feet long and 60 feet elevation. The operator's cage is located at the junction of the mast and boom, thus giving him a complete view of all operations. This system was adopted only after careful consideration of the various methods of handling materials for shipbuilding. Experience has shown that the rigs are adequate for the work and are thoroughly satisfactory in their operation.

Deliveries of rough lumber are made to the Tacoma yard by both rail and water. Water deliveries are handled by stiff leg derricks from the scows to a power feed roll way leading to two Stetson-Ross timber sizers, which handle all planing for the yard. From the sizers the timber is transferred by distributing rails to an aerial tramway serving a lumber storage yard 60 feet by 800 feet, with a capacity of ten million feet.

At Portland the lumber mills furnish ship timber already planed, so that deliveries are made to the yard by motor truck. Yard derricks handle it directly from the trucks to the storage piles.

The property layout at The Foundation yard on the Pacific Coast is highly similar and is the result of careful study to the end that there would be no lost motion in the progress of the heavy timbers as they are being worked into shape.



The ten ways of the plant are here shown and it will be noted that the second ways from the left end has just been vacated.

The large mill building in the center of the property contains the following equipment on the ground floor:

Five Fay & Egan band saws, one American 34-inch band saw; two American band rip saws; one Greenlee railway cut-off saw; one 54-inch cut-off saw.

Each of these saws is driven by a twenty-five horse-power electric motor.

On the upper floor of the mill building are the mold loft and the joiner shop, the latter equipped with the following machines:

One American 36-inch band saw; one American Variety saw, No. 10; one Hobbs pony planer; one Invincible buzz planer; one No. 2 American power chisel; one No. 3 American double spindle shaper; one wood lathe; one Prybil swing saw; one American tennoning machine; one 20 horse-power motor; two 7½ horse-power motors.

Adjoining the mill building is a two-story air tool house, 50 feet by 100 feet. The lower floor is devoted entirely to the storage of air tools, and the upper floor is equipped with saw filing and setting machines.

There is a fully equipped machine shop capable of taking care of machine repairs about the yard as well as turning out many articles of equipment. A storage warehouse and a large spar shop complete the list of the main structures in the plant.

As protection against fire, a high-pressure pipe

line has been laid out with numerous hydrants, supplied by motor-driven pumps. The fire marshal at each yard has a crew of trained men. The completeness of the system has caused the Insurance Bureau to give the Tacoma yard the lowest rating of any wooden shipbuilding plant on the Pacific Coast.

A description of the Foundation Company's Portland plant appeared in the July issue of the Pacific Marine Review, the two plants being similar in every respect. The shipbuilding record of this company is an object lesson in American versatility and energy.



Lumber storage yards of the Foundation Company's Tacoma plant are served by stiff-legged derricks.



The launching program at this Foundation Company's plant calls for a ship sliding down the ways every ten days. This schedule has been closely adhered to.



The McIntosh and Seymour twin 500 brake horse-power Diesel engines on board the motorship "Cethana."

Motorship for Australian Government

THE new motor ship "Cethana", which was recently built at the Olympia yards of the Sloan Shipbuilding Company, has had her installation of McIntosh and Seymour engines completed. The "Cethana" measures 280 feet long over all, 46 feet moulded beam, has a load draft of 22 feet and has a gross registered tonnage of 2341. She is the first of four similar craft building for the Commonwealth Government line of Australia, the names of her sister ships to follow being the Culbura, Chalamba and Coolcha. It is understood that these vessels, for the present at least, will be operated from Seattle to Sydney with cargoes of steel plate.

The power plant consists of two 500 brake horse-power, six cylinder, four cycle reversible McIntosh and Seymour engines of the full Diesel type. These engines are designed to operate at 185 revolutions and to work on heavy crude oil from 16 to 24 degrees Baume.

The ship is equipped with 60,000 gallon oil tank supply amidships, and there are two 800 gallon settling tanks in the engine room. This gives the Cethana a forty-day cruising radius.

The air for atomizing the fuel for the working cylinders, also that required for maneuvering, is

furnished by a three-stage compressor, located at the forward end of the engine and directly driven from the engine. In cases where the engines are used for twin screw vessels, this compressor is of ample size to supply atomizing and maneuvering air for both engines in case of necessity. It is substantially built with inter-coolers and after-coolers arranged according to the most modern practice. The valves and cages are all accessible and removable as a unit, making their removal or renewal a simple operation.

The thrust bearing is carried in a substantial base, bolted securely and doweled to the engine base, and contains a large bearing located at its after end, making it possible to carry the fly wheel overhung. The main working cylinders are bolted to the top of the engine frame and are of a simple design provided with removable liners. The heads are separate from the cylinder, each containing an inlet exhaust, fuel and starting valve.

The cam shaft is carried in a housing bolted to the engine framing, and driven by spur gears from the after end of the crank shaft. From the forward end of the cam shaft a fuel pump and speed limiting governor is driven.



The motorship "Cethana" built at the Olympia yards of the Sloan Shipbuilding Company for the Commonwealth Line of Australia.



A Maxim silencer completely muffles all noise from the exhaust.

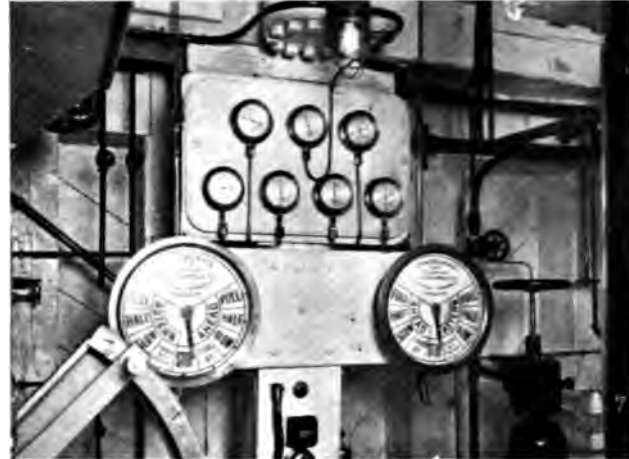
The maneuvering gear is located at the forward end of the engine. The maneuvering, which is accomplished by simple operations, is all done in the proper sequence, due to the interlocking features of this device, thereby preventing the operator from damaging this equipment, in any way, due to the misunderstanding of its functions. The supply of fuel and the consequent control of the ship's speed is accomplished by one single lever.

There is arranged a control lever, within easy reach of the operator, which is devised to relieve the cylinders of any pressure and, when brought into operation, automatically shuts off the atomizing air when these relief valves are open.

The lubrication for the working cylinders, piston pins and compressor is effected by the use of a Richardson Phoenix force feed lubricator, driven by gears and suitably timed, so that the lubricating oil is delivered to the various parts during that



Sufficient air is carried in the manoeuvring tank to take care of many continuous reversals of the engine.



Gauge board and engine room telegraphs on board the "Cethana."

portion of the cycle that is most beneficial. The oil for the crank pins, main bearings and other journals is supplied from a gravity system, through gang oilers conveniently located. As the engine is entirely enclosed, the base having a bottom cast in, the oil is all collected in the base, and is returned through a filter to the bearings by gravity. A small pump driven from the cam shaft is arranged for automatically handling this oil.

The principal features of this engine are: The thorough preparation of the fuel, which has proven to be very effective both on the marine and stationary engines, built by the McIntosh & Seymour Corporation. The thorough cooling of the upper part of the liner and cylinder head is also a point not to be overlooked in the selection of an engine for continuous marine service. The cooling system on this engine is so arranged that salt water can be used for cooling purposes without coming in contact with steel studs or any parts liable to be affected by it. It has the same effective cooling.



The Richardson-Phoenix oil filter on the motorship "Cethana."

however, as on stationary engines and the same even flow and proper circulation through the head.

The design and operation of these engines are such that an engine room crew of seven men is all that is required for continuous operation; one engineer and one oiler per watch and a chief engineer. Two additional men are required to operate the donkey boilers and winches while in port loading or discharging.

In a recent trip on Puget Sound, the Cethana developed a speed of eleven knots and the vessel handled well, being maneuvered in and out of her

dock without assistance. A speed even better than eleven knots is expected on the vessel's official trial.

It was found in operation that the engine could be reversed from full speed ahead to full speed astern in nine seconds and the absence of vibration attracted the attention of all those on board to watch the performance of the machinery.

The construction of the Cethana was superintended by Captain J. McIntosh and her machinery installation was made under the direction of H. H. Sanderson. Mr. C. A. Asplund was the engineer in charge for McIntosh & Seymour.

Special Features in Big Tacoma Yard

PHILLIPS MORRISON, C. N. Seaborn and H. F. Ostrander are operating in Tacoma, Washington, what they claim to be the best located, best equipped and most efficient four-way wooden shipyard now operating on the Pacific Coast. The yard occupies an area of approximately twenty-five acres with a long stretch of waterfront.

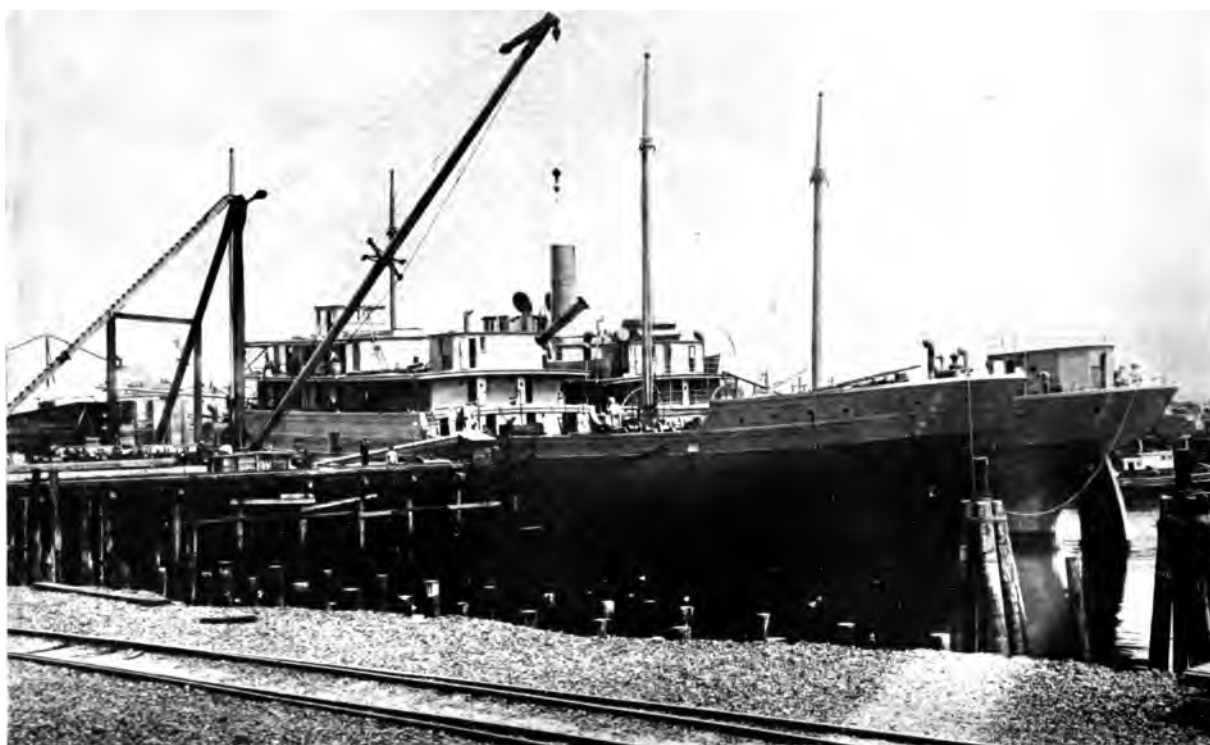
In the layout of the plant special attention was paid to the outfitting wharves and to the necessary equipment for the installation of machinery, the idea being to eventually turn this part of the establishment into a highly efficient repair unit.

The four building ways, which are at present occupied by four hulls of the Ferris design, are served by two large gantries, one placed between each set of ways. Back of the ways is a large area

for material storage and laying out work served by a long boom revolving crane, which handles material from the storage to within the sweep of the cranes serving the ships. The outfitting wharves are served by two powerful stiff-leg derricks, while a complete system of broad-gauge tracks and locomotive cranes take care of miscellaneous handling, shunting cars about the yard, transporting work between the shops, etc.

At the present time there are four United States Emergency Fleet Corporation vessels outfitting at the docks and splendid progress is being made in this work.

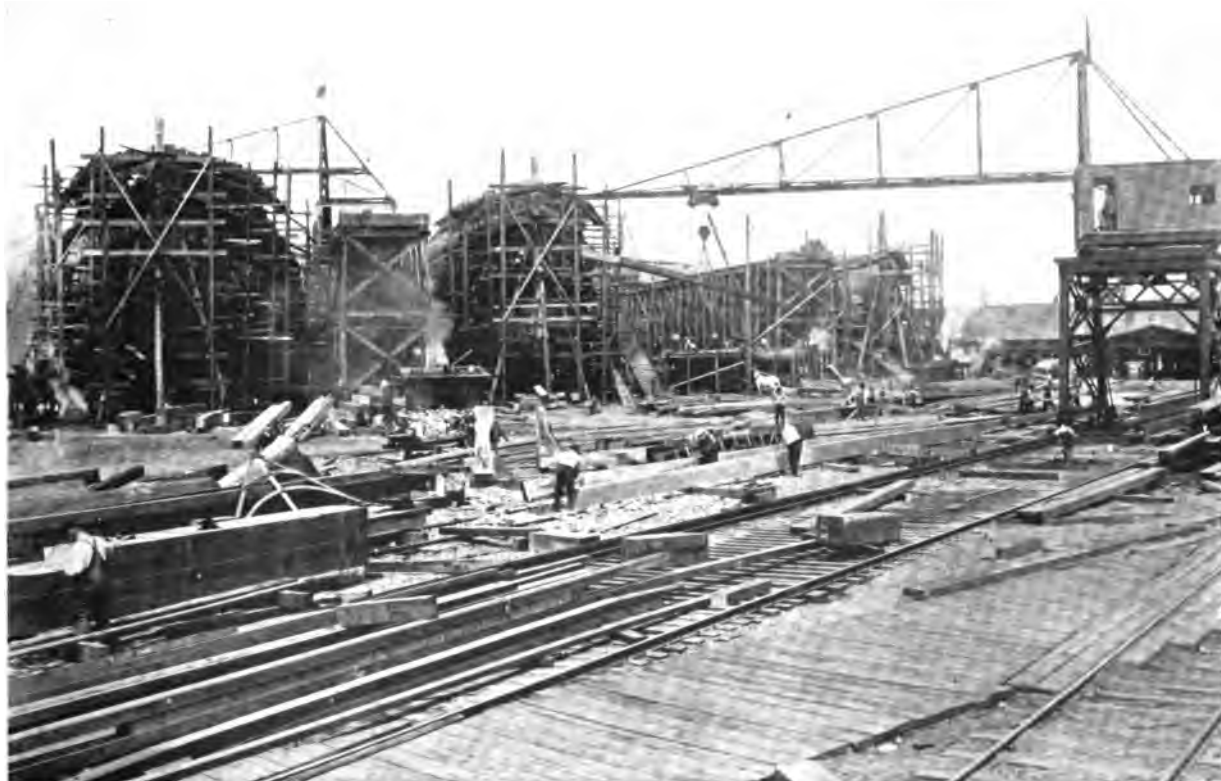
The machine shop and saw mill installations are very complete, and labor-saving devices have been adopted wherever practical.



Steamer being finished at the fitting out wharf of the Seaborn Shipbuilding Company, Tacoma, Washington.



At the Seaborn yard special attention has been paid to the fitting out feature as the yard intends to be a strong factor in the repair business.



View in the shipyard showing building ways, storage and laying out space and the traveling gantry used for handling materials.



Rear of the Puget Sound Machinery Depot's new boiler shop showing shipping facilities and storage yard with crane way for handling plates and boiler materials.

Erects Large New Boiler Shop

THE Puget Sound Machinery Depot, one of the largest houses in the Northwest dealing in machinery supplies and carrying on the manufacture of various shipyard and ship equipment, as well as making Scotch marine and watertube boilers, recently completed a fine new boiler shop where a large amount of marine work is now being turned out.

The new boiler shop is 240 feet long and 160 feet wide, being divided into three main bays by the arrangement of overhead handling equipment. Great care has been exercised in selecting the machinery equipment for this shop, and among the larger tools are a set of plate tools accommodating work fifteen feet wide, two hydraulic bull riveters,

one of the largest hydraulic flanging presses on the Pacific Coast, several six-foot radial drills, punches, shears, etc., as well as the smaller tools and equipment required in the manufacture of water-tube boilers.

There are eight electric travelling overhead cranes serving the boiler shop, the largest crane in the main bay of the building having a fifty-foot span, travelling the full length of the structure, and having a capacity of 30 tons with a clearance under the hook of forty feet. The other cranes are located in the main and side bays. Cars are run in at the rear of the shop and handling both to and from them is accomplished direct by the shop cranes. The facilities have been provided for a heavy out-



The new boiler shop is a splendidly designed and well lighted structure and gives the Puget Sound Machinery Depot one of the best boiler plants in the Northwest.



Section of the shop showing hydraulic bull riveters.

put of both Scotch marine and watertube boilers and the demand is such that the firm has been employing three shifts per day in order to keep up with orders.

The Puget Sound Machinery Depot has carried on a large business in power and transmission machinery throughout the Northwest for years, its present progressive management including Edward I. Garrett, president; John W. Eddy, first vice-president; A. B. Shafer, second vice-president; and George B. Gemmill, assistant secretary.

HEAVY DEMAND FOR LOCAL MAGNESIA

Owing to the enormous demand for magnesia steam pipe and boiler insulation, the Western shipbuilders are installing large quantities of Pacific Coast manufactured magnesia insulation. The vast magnesite deposits in California have made it possible for the shipbuilders of the Pacific Coast to obtain their magnesia requirements from their home market, thus avoiding great delays incident to oversold conditions of the Eastern manufacturer and delays caused by overland rail shipments.

The National Magnesia Manufacturing Company



A corner in the erecting department showing watertube boilers under construction.

enjoy the distinction of being the only Western manufacturer of 85 per cent magnesia steam pipe and boiler insulation. The National Magnesia factory, located in Redwood City, is producing quantities of this material to supply the requirements of the Pacific Coast consumer.

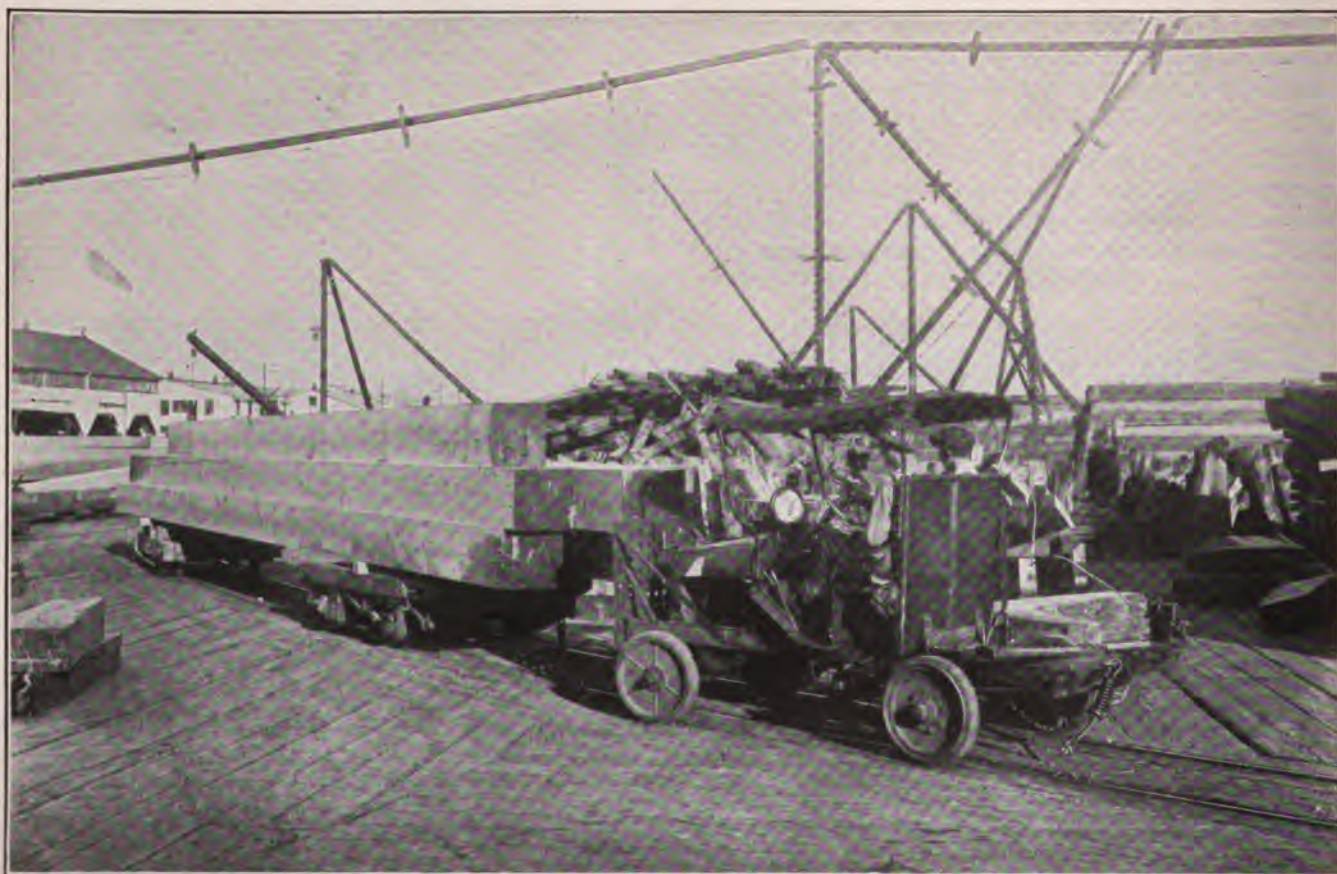
To properly serve the ever-increasing field for the National Magnesia line, this enterprising company has appointed agents along the Pacific Coast, their latest connection being F. T. Crowe & Company of Seattle and Tacoma. F. T. Crowe & Company have built up a large business in building materials and contractors' supplies, and are to be congratulated upon obtaining the agency for National Magnesia in the Puget Sound territory.



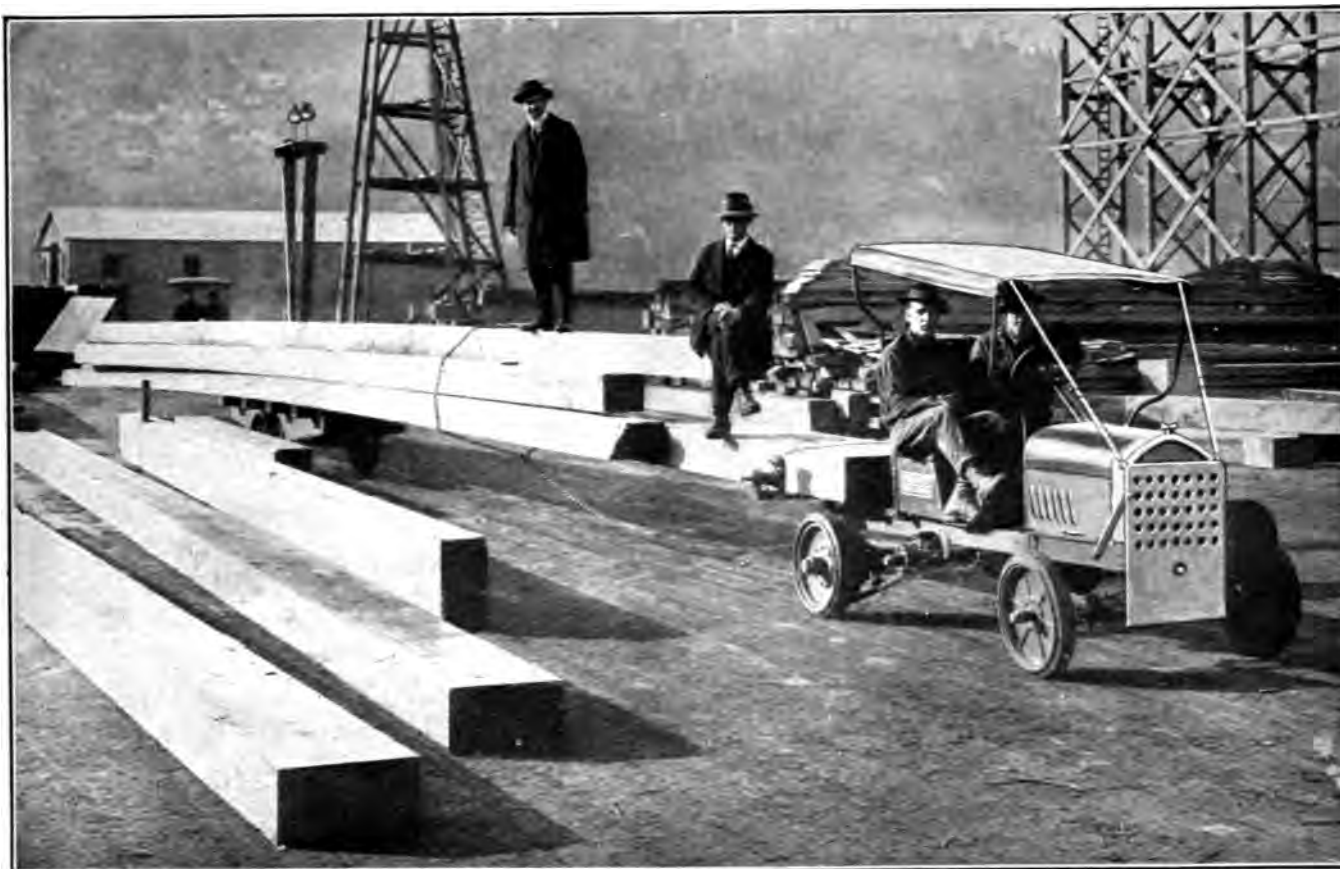
The steel casing department where all light steel and sheet metal work is turned out.



With a tractor, loaded trucks can be moved much more quickly and economically than with horses. This load of about 15,000 pounds is being moved at the Grant-Smith Porter yards at Portland, Oregon.



Using a Prescott tractor instead of a locomotive at the Foundation Company's Tacoma plant. Loaded cars or empties can be either pulled or pushed with a tractor.



An illustration of what a tractor can handle. A loaded truck like this is easy for one of these powerful little machines.

The Tractor's Place in Shipyards

IS it a job of moving a lot of timbers, or chains, or plates, or lumber—or any of the scores of hauling jobs that come up daily in the shipyards? These days you'll find a tractor doing them all, and with ease.

These little giants have been adopted by the shipbuilding business on the showing they made of indispensability in the lumber yards of the Pacific Northwest, where there are hundreds now in use. There, for the past few years, they have been supplanting horses because they were able so clearly to demonstrate their economy in comparison with the old method. When a little machine proves that it can do the work of six horses at a maintenance cost of less than the "overhead" on one horse, naturally it is "good night" to the horse. Also, it is only a question of time until such a machine finds employment in other industries, always looking for money-saving short cuts.

So last year the Sumner K. Prescott Company of Seattle began to note a considerable interest on the part of shipbuilding men in their powerful tractors. And as everybody knows now, the need for them in shipyards was a real one, for there are so many things to be moved that cranes and derricks do not easily reach; loaded and empty cars, wagons, refuse carts, besides the many heavier loads that may be piled on a truck and hauled easily with a tractor.

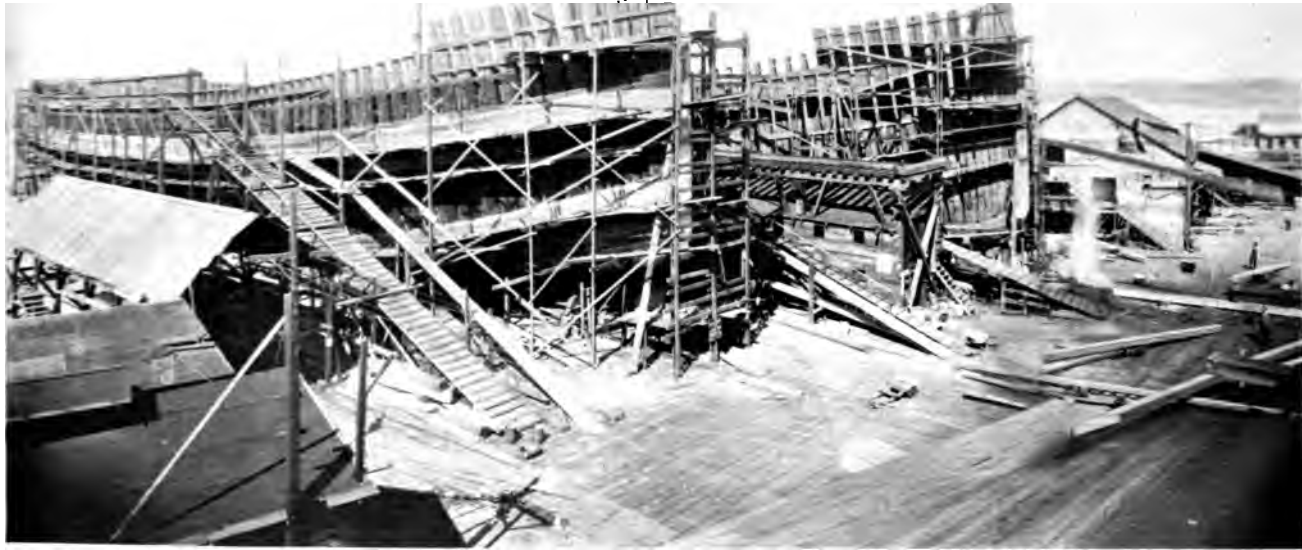
Now they are in shipyards in all parts of the country. Grant Smith Porter Ship Company, for

example, in their famous yard which in June had first place in wooden shipbuilding in the United States, is using eight Prescott tractors, and the Foundation Company, now using twenty of the same type of machine, have just ordered five more for their New Orleans yard.

Their quick recognition and the rapid extension of their use are proof of the service that tractors can give. They have been greatly improved since their early days and the late models, among other features, are made with a shortened wheel base which, of course, means a smaller turning radius—a detail that has been found to be a convenient one in both lumber and shipyards.

As an efficient means of making short hauls, the tractor has unquestionably made a permanent place for itself.

The tractor with its truck trailer is becoming more and more general among the items of shipyard handling equipment. No matter how complete a system of trackage is laid for the use of locomotive cranes and railway cars, there will always be many out of the way corners which cannot be reached by these big machines, while the tractor will go anywhere, thus insuring that no valuable storage space is lost. In the handling of those weights too heavy for manual carriage and yet too light to send a big locomotive crane all over the plant with, the tractor is also very valuable in releasing the larger machine for work that is more in keeping with its size and cost.



View of the building ways at the Babare Brothers Shipbuilding plant at Old Town, Tacoma, Washington.

Tacoma's Pioneer Shipbuilders

THE plant of Babare Brothers at Old Town, Tacoma, is at present occupied on the hulls of two of the Ferris type ships for the Government. These ships are both well along, one of them being scheduled for launching during the present month and the other is to go overboard in September. These ships will be followed immediately by two more vessels of the same class.

The first ship finished for the Government by Babare Brothers, the Mahaska, has just completed outfitting and has been turned over to the Matson Navigation Company under charter to carry a load of bunker coals from Vancouver Island to the Hawaiian Islands, from whence she will return with sugar to San Francisco.

The Mahaska is of the standard Ferris type of 3500 tons deadweight capacity and her 1400 horsepower engine will give her a speed of ten knots at sea.

The Babare Brothers' plant is located on five acres of ground at Old Town, Tacoma, facing the entrance to Tacoma harbor and possessing an excellent water-frontage. There are two building slips, each served by a large gantry crane, while a pair of locomotive cranes handle lumber and shapes in and about the yard, where an extensive system of trackage reaches every part of the establishment.

The saw mill has been fitted with the finest heavy wood-working machinery, the members of the firm, who have originated several widely-used wood-working tools, being very particular about this branch of their yard equipment.

Electric drive is used throughout the plant for all tools and also for driving two compressors which furnish air for a considerable number of pneumatics.

Perhaps the most unusual feature of the Babare plant at Old Tacoma is the unusual extent to which the machine shop has been developed. This has

been occasioned by the demand made by other builders for some of the tools perfected and patented at this plant. An electric planer gotten out here has found its way into numerous Gulf and Atlantic Coast yards, as well as becoming popular along the Pacific, and the resulting demand has necessitated a large machine shop, and the institution of factory methods. A caulking machine has also been brought out here which has met with a hearty response and is finding its way quickly among the yards of other wooden builders.

The Babare plant employs about three hundred men, and it is worthy of note that the institution has been singularly free from labor troubles.

The Babare Brothers are looking sanely to the future and quietly laying their plans to discount any probability of a sudden cessation of the demand for new vessels along the Pacific Coast. Previous to building large wooden steamers for the Government, this firm was constructing cannery tenders and purse seine boats for the fishermen and canneries of Oregon, Washington and Alaska, and in the spring of 1917 their output of this class of tonnage amounted to sixty hulls, averaging from 60 to 65 feet in length, and powered with gas engines, ranging from 40 to 80 horsepower. These seine boats and tenders are always in demand in the Northwest, the business for them steadily increasing, while the natural wastage has to be taken care of at the same time.

It is the intention of the Babare Brothers to return to this class of work as soon as the Government's need for more vessels ceases. At the same time, good use will be made of the excellent shop equipment that has been built up for the purpose of manufacturing certain ship yard tools, as the firm is perfecting its own type of gas engine and intends to furnish its fishing craft complete. Babare built and Babare equipped from stem to stern.

Remarkable Development of Moore Yard

THE development of the Moore Shipbuilding Company properties from the original Moore and Scott plant installation on Oakland Estuary furnishes a fascinating story of perseverance and accomplishment, for today the Moore Shipbuilding plant may be compared favorably with any steel fabricating institution in the United States.

It was an ancient Dutch congregation which one day passed the resolution to build for themselves a new church, to build the new church out of the materials from the old one and to use the old church while the new one was being built. It was in a somewhat similar predicament that the Moore Shipbuilding Company found itself. The equipment of the plant was good, but it was inadequate for the work in hand. The shops were too small and the erection of new building ways left them rather poorly located, but despite all this work must progress and the machines in these shops must be utilized to their fullest efficiency at the same time that new structures were being built to house them, new handling equipment being installed throughout the yard and notable additions to both shop and building ways equipment were being made.

In short, the Moore Shipbuilding Company's property has been metamorphosed from an ordinary construction and repair yard to a really great shipbuilding establishment, and the fact that during this period of change and growth the plant has stood in the very front rank of shipyards distinguished for their output record speaks volumes for the skill and energy of the management of Oakland's greatest shipbuilding unit.

The firm of Moore and Scott, now the Moore Shipbuilding Company, prior to the present great shipbuilding boom, had been engaged for years in large ship repair work, many notable jobs having been handled here, and in the construction of moderate sized vessels, such as the Western Pacific ferry "Edward T. Jeffery" and other well known craft. The plant is situated at the foot of Adeline street in Oakland and the available water front has been greatly added to by purchase of adjoining property from time to time. With the acceptance of orders for large freighters, the shops of the concern, while possessing many high-class tools, were found to be inadequate and the plant was entirely remodeled, the old shops being moved or dismantled as the new ones were erected. Five ship ways were installed and a system of stationary tower cranes adopted for handling material about the ways. These cranes consist of a large square frame work tower with a boom on each corner and are so arranged as to reach all parts of a hull on the stocks, the operators being high enough to have a full view of the load and its destination at all times. These cranes, in conjunction with a complete system of broad-gauge railway tracks, make a complete, simple and economical handling system.

Large Additions Made

Owing to the great amount of work entrusted to this plant, however, the three building ways proved inadequate and two more were added. Even this fell short of the requirements, and upon receiv-

ing their recent large order from the Shipping Board, the Moore Shipbuilding Company proceeded to install three more building ways, the new structures to be six hundred feet in length and able to accommodate such vessels as the large new troop transports of which the Shipping Board has ordered a large number and which will be utilized as ocean passenger liners when the war is over. This gives the plant facilities for laying down eight large steel steamers at one time.

At the Moore yard, material is brought directly into the plate storage racks by spur tracks connecting with the Southern Pacific and Western Pacific Railway systems and is handled from the cars to storage or to the plate shop by a travelling gantry which directly serves the entire storage space. Alongside of the plate shop is a large open space for assembling bulkheads and other outdoor plate work, and this space is served by a powerful revolving crane with a long arm.

The plate shop and mold loft are well designed and the plant has some excellent records to its credit in the matter of weekly tonnage of material fabricated. The plate shop contains a very fine set of punching machines and also some noteworthy bending rolls, one of these roll sets being twenty-five feet between bearings and with rolls twenty-eight inches in diameter. Some large flanging presses will also be found which bear witness to the excellent class of work turned out in the Moore shops, these being of the firm's own design and make.

The clerical, timekeeping and managerial forces, draughtsmen and government inspecting forces are housed in a modern, well-lighted office building, attached to which is a large concrete and steel fire-proof safe, the upper floor of which is utilized as a tracing storage and file.

A new joiner shop fitted with the highest class wood-working machinery was installed with the first large expansion of the plant, and the powerhouse equipment was greatly added to, especially in the way of new air compressor equipment.

New Boiler Shop

With the recent purchase of waterfront on which to erect their sixth, seventh and eighth building ways, the Moore Shipbuilding Company secured sufficient land to accommodate a large boiler shop. This shop, which is nearing completion, is 200 by 200 feet in size and is being fitted with the heaviest and most modern boiler-making machinery, the company having accepted contracts for a large number of Scotch marine boilers of the general size and type adopted for all the large vessels for the Shipping Board, which are to be equipped with steam raising units of the Scotch marine type.

One of the interesting developments at the Moore plant was the determination of the Shipping Board to fit out several of the vessels built here as refrigerator ships and this work is now under way; the vessels ostensibly are for the purpose of carrying frozen meats to Europe.

Another interesting feature of the work of the technical staff of the shipyard was the development of the 9400 ton deadweight ship. This type of hull has met with high approval, and the fact that the



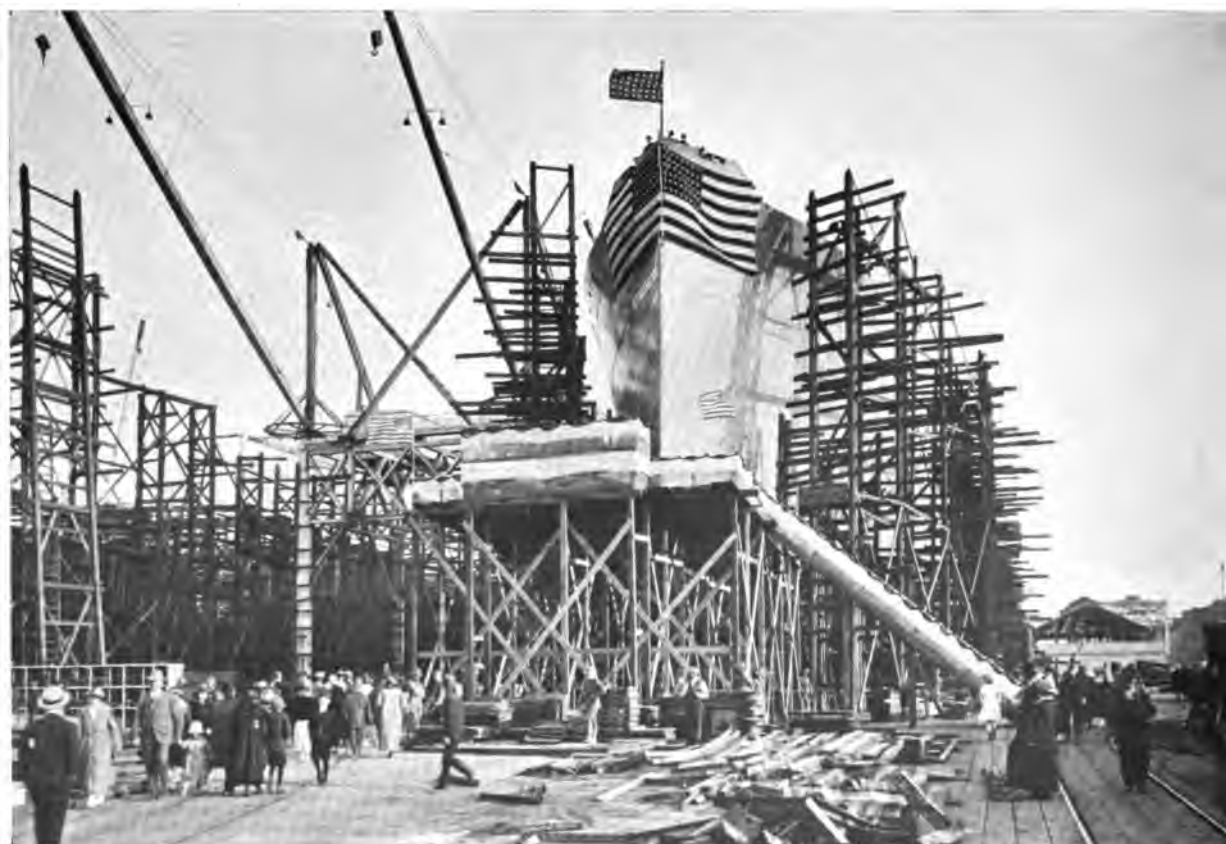
Robert F. Moore, Chairman of the Board of Directors, Moore Shipbuilding Company.



George Armes, President, the Moore Shipbuilding Company.



Mr. Schwab's visit to the Moore Shipbuilding Company's Plant on July Fourth. The central group in the picture including Charles A. Piez, vice-president of the Emergency Fleet Corporation, George W. Dickie, resident Government inspector at the Moore plant, and Charles M. Schwab.



The steamer "Yamhill," 402.5 by 53 by 26.5 feet, molded dimensions, ready for launching at the Moore Shipbuilding Company's plant on July Fourth, she being one of three launchings from the Moore plant on that day.

extra deadweight capacity over the 7,100 ton dead-weight types was secured with the expenditure of a very few tons of steel, speaks volumes for the designing skill of "Benny" Hedstrom and his assistants.

In addition to their Oakland yards and shops, the Moore Shipbuilding Company maintains one of the best equipped machine shops in San Francisco at 678 Second street. The equipment of this shop embodies the results of many years of machine shop experience and is an important adjunct to the plant on the eastern side of San Francisco Bay.

A great deal of stationary work, as well as marine engine repair work, is carried on here, and the shop is well known up and down the Coast.

Several months ago the directors of the Moore Shipbuilding Company decided that the tremendous amount of work devolving upon Mr. Robert S. Moore made an enlargement of the managerial forces imperative. Some time previous to this, Mr. George Armes, formerly chief engineer of the Union Plant of the Bethlehem Shipbuilding Corporation, had entered the services of the Shipping Board, and that body expressing its opinion that Mr. Armes could be even more helpful to his country as the head of a great shipbuilding concern than as a member of the Shipping Board's construction forces, Mr. Armes consented to join the



The big freighters "Guimba" and "Yaquina" launched at the Moore Shipbuilding Company's plant on July Fourth.

Moore Shipbuilding Company as president, Mr. Robert Moore becoming chairman of the board of directors. This arrangement served to relieve somewhat the great pressure on Mr. Moore, with the result that the big plant is operating more smoothly than ever.

The Moore Shipbuilding Company has built up a compact, well-arranged shipyard, the management is progressive and improvements are steadily under way, the class of ship and machinery work being turned out is very high, and there is every reason to believe that the firm will hold a high place among the shipyards of the country when we begin to take stock of our shipbuilding achievements a few years hence.

The Diesel Engine as Related to Wasted Power

By Philip Lane Scott

AT the time of this writing the whole country is suffering greatly from a lack of fuel to produce power. Those of us in the East, laboring under the present coal and oil restrictions, have learned the lesson by the severest experience. In some districts the supply of fuel is sufficient, but distribution facilities are sadly lacking. This lack is, itself, also to a considerable extent, a result of lack of power both motive and industrial. An obvious solution is an increase in the transportation facilities, but a second thought shows that this is not at all a remedy for the primary cause of the trouble, wastefulness. It is merely dodging the issue.

If we could obtain three times the amount of power from the same amount of fuel the difficulty would be overcome. It would be a cure for the disease and not a temporary alleviation. If the ships now waiting in New York harbor for fuel, required but a third or fourth the amount of fuel for the journey, then three or four vessels would sail for every one that sails now. The proper solution lies in a proper economic use of the available supply and not in adding tremendous burdens to

transportation and mining operations to keep up the criminally wasteful power production.

It is with this latter aspect of the problem that this article deals—a means of more economic use of our fuel supply by closed retort distillation of bituminous coal and the use of some of the oils obtained in Diesel and surface-ignition engines.

Last year about 550,000,000 tons of bituminous coal were mined in this country 502,191,000 tons from January 1 to November 30, report U. S. Bureau of Mines). About 35,000,000 tons of coke were produced in the same period in bee-hive coke ovens and about 15,000,000 tons in by-product ovens. The by-product coke production is thus but 30 per cent of the total, which means that 70 per cent of the valuable by-products of the distillation of coal, drugs, dyes, disinfectants, explosives, pitch and (most important of all for the purpose of this article) fuel oils were completely lost because 70 per cent of the coal was coked in bee-hive ovens. Coke produced by the bee-hive system amounts to about 50 per cent of the weight of the coal. The 35,000,000 tons of coke represent about 70,000,000 tons of coal. Good fuel oils in

this coal are about 2 per cent of the weight or 1,400,000 tons (3,800,000,000 pounds) of oil. One brake horse power hour in a Diesel engine is produced on about 0.45 pounds of this oil. Therefore this oil represented 6,200,000,000 horse power hours literally thrown to the winds. This represents 2,500,000 tons of shipping (fast freighters) in operation, without a day's cessation, for a full year. And yet we cannot supply our ships carrying war supplies with sufficient fuel. This wasteful practice can hardly be corrected by arbitrary laws or regulations. Our government operates upon the sum of the actions of individuals. If the individuals are intelligent and well educated, our form of government is a success. The improvement of our power production methods thus seems to be a matter for self-undertaken education.

It is quite true that by-product distillation of coal is now, in many cases, commercially unprofitable because only 10 per cent of the coal tar can readily be used for drugs and dyes. For the other 90 per cent we have but a small market at present. The pitches are used as road binders and the creosotes as preservatives and disinfectants, but we still import a large proportion of our creosotes from abroad. We have been able to buy our coal tar drugs and dyes cheaply from Germany. This source is now closed and will probably remain so, due to the development of the dye industry in this country and to public sentiment. But the demand for coal tar products for these uses is rapidly increasing.

So far there has been very little demand for the so-called "dead" oil distilling between the fractions used for dyes and drugs and the pitches and creosotes. This "dead" oil is a good Diesel engine fuel. Such a use would create a market, now lacking, for another of the by-products of the distillation of coal and increase the possibility of making by-product distillation profitable.

Germany has very little crude oil. She has, however, a sufficient supply of coal and she has accomplished with her coal what we have failed to accomplish with our tremendously greater coal and oil resources. The by-product distillation of coal is carried out to a highly successful point in Germany.

The following material on the production and use of tar oil in Diesel engines was gathered by the writer while working on the problem in that country in the year 1915-1916.

The German tar oil is a mixture of the second, third and fourth fractions in the distillation of coal, "middle," creosote and anthracite oil. It represents about 35 per cent of the coal tar and from 2 to 5 per cent of the coal. In it the characteristics of creosote oil predominate.

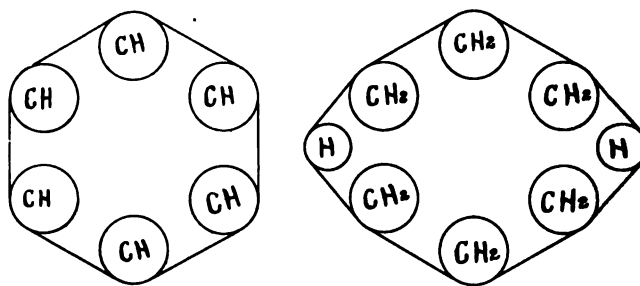
For use in the Diesel engine, tar oil should meet the following specifications:

- Not more than 0.7 per cent sulphur.
- Not more than 0.05 per cent ash.
- Not more than 0.2 per cent of substances insoluble in xylene.
- Not more than 1.0 per cent water.
- Not more than 3.0 per cent coke.
- Lower heating value about 8,800 calories/kg.
- Specific gravity 1.0 to 1.1 (water = 1).
- Average 1.4 to 1.06.
- Carbon about 90 per cent.
- Hydrogen about 7 per cent.
- Flash point about 65 degrees Centigrade.

Ten cubic meters of air are required for the complete combustion of one kilogram (160 cubic feet of air per pound of oil).

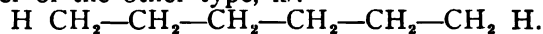
It has been observed that it is much more difficult to induce combustion in tar oil than in gas oil. One possible explanation of this peculiarity lies in the fact that the hydro-carbons in tar oil belong to the benzol "ring", while most of the petroleum hydro-carbons belong to the benzene "chain". The molecules have different atomic construction, an actual physical difference of some sort.

The graphic formula for benzol (C_6H_6) is



A complete bond is supposed to exist between all atoms.

The graphic formula for hexane (C_6H_{14}), a member of the other type, is:



A "loose" hydrogen atom at each end.

It is possible that more energy is required to tear down the completely closed molecule than the one with loose atoms.

Another peculiarity of tar oil, which, however, does not affect the combustion, is a slightly acid reaction. This is due to the presence of hydro-carbons resembling carbolic "acid" in structure. Tar oil will slowly attack tin, zinc and copper, and therefore these metals even as alloys (solder, for instance) should not be used in the piping or valves through which the tar oil is to flow.

To secure good combustion in a Diesel engine using tar oil the following conditions should be observed: Both injection air and the oil should be preheated. The spray valve should not be cooled. The angle of advance of injection should be from one-half to three degrees greater than for gas oil. The amount of injection air must be reduced to the minimum compatible with good atomization, to reduce the cooling action on the spray. The compression and cylinder temperature should be high. Hot elements in the cylinder are advantageous. Atomization must be good.

There are other oils suitable for heavy-oil engine fuels obtainable from illuminating gas plants, from lignites, shales and peat. They are:

Vertical oven tar oils.

- Specific gravity 1.10 to 1.18.
- Free carbon 0.2 to 4.3 per cent.
- Flash point 40 to 70 degrees C.
- Viscosity 18 to 45 degrees Engler.

Horizontal oven tar oils.

- Specific gravity 1.16 to 1.25.
- Free carbon 14.9 to 33 per cent (very objectionable).
- Flash point 71 to 90 degrees C.

Viscosity 16 to 51 degrees Engler.
 Lignite oils:
 Solar oils.
 Specific gravity 0.82 to 0.835.
 Light tar oils.
 Specific gravity 0.845 to 0.870.
 Heavy tar oils.
 Specific gravity 0.875 to 0.900.
 Paraffin oils.
 Specific gravity 0.898.
 Creosote oils.
 Specific gravity 0.957.
 Heating value 9,790 cal./kg.

Peat oils.
 Specific gravity 0.853.
 These oils burn more sluggishly than lignite oils.
 Shale oils.
 Specific gravity 0.740 to 0.980.
 These oils are a source of fuel which we have scarcely touched and which make possible very economic production of power when used in Diesel or surface-ignition engines.
 There is a great opportunity for the development of this source of power along with our newly established coal tar product industries. We must study the problem with care and patience.

Keeping the Flag on the Seven Seas*

By Douglas Erskine, of W. R. Grace & Co.

SINCE being asked to address you on the subject of how to keep the American Flag Afloat on the Seven Seas after the War, this question, which has been the subject of much thought on the part of those interested in the Nation's maritime welfare, has been brought to a concrete form. A week ago the United States Shipping Board announced the appointment of John H. Rosseter of this city as director of operations. The press dispatches contained the news that this department of the Shipping Board's activities, in addition to the colossal task of directing the movements of all the vessels flying the American flag, will devote its attention to the evolution of a plan for keeping the American mercantile marine employed after the war and of increasing its scope, so that we may expect suggestions for legislation from this source that will benefit shipping.

Merchant Marine National Necessity

The war has shown that this country must maintain a mercantile marine commensurate with its size and importance. Even before America entered the war, the lack of a merchant navy was keenly felt. Other nations, both belligerents and neutral, needed all the tonnage they could control to minister to their own needs. America found itself cut off from many of the sources of its supplies and also from the markets to which it had been shipping its products and manufactured goods in foreign bottoms. War conditions made it imperative that a large fleet of merchant vessels be built and be built quickly. The nation's shipbuilders have responded nobly, and the numerous launchings, which are daily reported from all our seaboards, are proof that the United States will be able to handle the herculean task of transporting its troops, munitions and supplies to the war zone and at the same time take care of the ocean transportation necessary to the sustenance of the country itself.

Before the war opened our eyes to the fact that a mercantile marine was a National necessity, this country had treated the shipping industry with indifference. Development of the great resources and manufactures occupied the attention of the great bulk of the people, who were satisfied with the accumulation of wealth internally and did not realize that beyond the shores of the United States there lay a fertile field. This field was not being

overlooked by other maritime nations, and, while America remained inactive as regards ocean transportation, enormous revenues were acquired by the countries which recognized the importance of the shipping industry.

Our Clipper Ship Achievement

In the days of the clipper ships, when American builders and American sailors made ocean-going carriers flying the Stars and Stripes the envy and admiration of maritime nations, Yankee ships were the prize freight carriers of the world. Their speed enabled them to make more regular passages than the less efficiently handled ships of other countries, and the national wealth was increased by the freight money which came to this country as the result of the carrying activities of these ships. With the advent of steam this advantage was lost to American seafarers. The British government, recognizing the fact that power-driven vessels must eventually supplant those depending on the wind and weather, encouraged its shipowners by enacting favorable legislation and also by direct subvention.

The American government, after a short spell of lukewarm support, left the shipowners of this country to shift for themselves, and American shipping was practically driven from the seas on account of its inability to compete with the government-aided vessels of other nations. The higher standard of living in this country was the cause of legislation which made wages higher on American ships and made the upkeep of the vessels higher than in other lands. The great majority of our citizens outside of those directly interested in ships did not know that in making it compulsory for American ships to pay more wages than their competitors and to compel shipowners to comply with many costly restrictions, they were throttling a great industry.

Merchant Fleet Manufacturing Asset

When American producers, manufacturers and merchants ship their goods to foreign lands in foreign bottoms, the transaction is complete as far as this country is concerned. The foreign vessel has been provided with an American cargo and from the time she leaves a dock in this country the revenue from the transaction goes to the country owning the ship. If goods were shipped from this country in ships flying the American flag, the American shipowner and the American sailor are

*Address delivered July 8 before Foreign Trade Conference at Annual Convention of Advertising Clubs of World, at San Francisco.

all the people connected with shipping in its numerous phases would be interested in the transaction until such time as the goods were landed on a foreign wharf, and the freight money would be earned by this country and would go to swell the wealth of the Nation and increase its general prosperity. Similarly, when goods are brought to this country in American ships the freight money on the imported goods, which is of course added to the cost and is eventually paid by the American consumer, remains in this country as a part of the earnings of the shipping industry. That this source of income is a productive one is shown by the fact that in one year the profits to Great Britain from the shipping industry added ninety million pounds, or about \$450,000,000, to the national wealth. Besides the men who actively operate and sail the ships, the bigger the fleet of vessels that can be properly employed under the American flag, the larger will be the number of men occupied in ship-building and its allied industries and the busier will be the cities of the seaboard where the handling of ships and their cargoes is the main business.

National Prestige Maintenance

After the war, America will have its fleet—that is, it will have a fleet suitable for the emergency which called it into being—a fleet constructed for the purpose of meeting conditions caused by war. After the war it will have to be augmented by vessels which, while necessary in time of peace, could not be properly provided during the rush and stress of war times. The flag of a nation when borne by vessels to all parts of the world is a potent factor in establishing the prestige of that nation in other countries. The warship carries the impression of power; a merchant ship suggests wealth and business energy. What deepens the impression and makes it permanent is the regular liner. These vessels coming and going with the regularity of clock work instill into the mind of the foreigner the idea that here is a nation that knows how to do business—nothing spasmodic, nothing haphazard. These vessels ride over all difficulties that human power can remove or overcome and are only diverted from their schedule by the act of God or the perils of the sea.

The American mercantile marine can only maintain its place on the seas if it is given a chance to go after the trade of the world on an equal basis with the ships of other nations. The laws which hamper the operation of ships must be modified or the higher standards imposed by the law and which act as handicaps in world competition must be offset by government support. When the ships of this country shall be given the opportunity to start even with their competitors, American efficiency may be trusted to do the rest. The government needs the mercantile marine in time of war, and it is incumbent upon it to support it in time of peace, so that when a crisis such as the Nation is now passing through arises, we will not again be found unprovided with such an important weapon of defense.

The producers, manufacturers and merchants will also have to do their bit to aid the shipping industry of the country. By shipping their freight in vessels that carry the Stars and Stripes, they will be helping to maintain a merchant marine which will be of vital importance to the country when trouble arises. The farmer, the miner, the stock raiser, the packer—in fact, everybody who has

goods to ship—must remember that it is his duty to support the merchant marine with the same cheerfulness that he supports the army and navy. In time of war, when the country calls upon its resources, the merchant marine that is ready is as important as the army and navy that is ready. Without the speedy liner and the steady tramp, the efficiency of the Nation's fighting forces may be seriously crippled, if not rendered absolutely ineffective.

Government Operation of Ships

Operation of ships under government direction is necessary in time of war, when every vessel is in the Nation's service. In time of peace this would be impracticable, when foreign competition has to be met with educated foresight and instantaneous decision, with knowledge of ships and ports and ocean routes, of cargoes and costs and the thousand-and-one details that make the difference between a profitable and a losing venture on the sea.

These ships will have to be manned. They will have to be manned by America. Seafaring must be made worth while to the kind of men who will make the American merchant marine worth while. Government aid will enable shipowners to provide their seamen with good quarters and good food. With the wages now paid on American ships, and which will in all probability continue after peace has been achieved, men will be attracted to a healthy and honorable calling which holds a place second to none in the history of the world. The days will be revived when young men will once more feel the fascination aptly described by a famous novelist when he referred to "the glories of the seas, the magic of ships, and the wonders of a thousand harbors."

Relapse to Pre-War Conditions Impossible

The Nation is aroused. The method of its awakening to the vital importance of ships has been too rude and too thorough to make a relapse to somnolency possible. The indifference of former years will not recur—at least within the days of the generations who have had actual contact with war conditions during the present gigantic struggle. America has the will and the power to resume its place in the front rank of maritime nations—aye, even to go beyond that and take the leading place. When the chains that have bound American shipping shall have been sundered, then the United States of America will stand forth as it always should have stood forth, and we shall no longer suffer embarrassment when our children ask us, "Why do they call Columbia the gem of the ocean?"



What Will Ocean Delivery Service Mean to You?

By Edward N. Hurley
Chairman United States Shipping Board

AMERICAN business has the best delivery service in the world—for customers at home. The department store not only delivers a spool of thread to a remote suburb on schedule, but delivers it through an interlocking system of motor trucks, light vehicles, branch distributing stations and wagon routes, which speed up service and cut costs. The manufacturer and jobber reach their customers by flexible railroad service extending from the loaded freight car to the emergency express shipment to fill out missing stock numbers—and if these do not suffice they get closer to the customer with branches. This typical American delivery service has been extended to soil products, like California oranges, Colorado cantaloups, northwestern red apples, Florida grapefruit, Georgia peaches. By means of the refrigerator car and modern grading and packages, new trade has been built by serving new customers in new ways.

But all this delivery development is for our home trade. No country in the world hauls a ton of freight on the railroads as cheaply as we do. No country in the world has linked up such vast territory as ours on a modern delivery basis. Almost anything we raise or manufacture anywhere in the United States can be hauled profitably, quickly, right side up, in good order—at home. We are not daunted by distance, bulk, expense, or difficulties. If one delivery method doesn't work, we invent another.

But always for ourselves.

When we have prime American products to deliver to a foreign customer, it has been our practice thus far to call in a rusty ocean tramp steamer, turn the job over to a foreigner, and forget about it.

Imagine a great factory or department store with no deliver system for its customers. When goods are packed, the shipping clerk steps to the door, whistles for any old expressman or teamster, and hands the goods over to him. That is what we have been doing in foreign trade. The more dilapidated the expressman's rig, and the cheaper his bid on the job, the better we thought it.

Meanwhile, the Briton and the German have been reaching some of the best trade in the world by the best ocean-delivery service. We started our jobbing teamster to South America with our goods and forgot all about him. He promises to get there as soon as he could. While he was on the road, the Briton and German sped past him with fast delivery trucks of the latest type.

But the war is going to change all this. When we get done with our job of making the world safe for democracy, we will have 25,000,000 tons of merchant ships, or the equivalent of England's mercantile marine, which is the largest. Today we are building ships for war. But each improvement in war shipping brings its corresponding improvement in merchant shipping. A year ago we would have been glad to get our hands on ships of any size or type, and our hopes were centered on a large fleet of wooden steamers of moderate capacity. Today, while still keeping all our wooden shipyards busy, we have increased the size to

5,000 tons, and now know that most of this wooden tonnage will be kept in coastwise trade, releasing the steel ships for the war zone. Where we were glad to get steel ships of 5,000 to 7,000 tons a year ago, now we are building them in 8,000 and 10,000 ton types, and planning troop ships of 12,000 and 15,000 and even 20,000 tons, with speeds of 16 to 20 knots an hour.

It is none too early for the American business man to begin thinking of these ships in terms of modern delivery service to foreign customers. And not the business man alone, but the farmer, the consumer, the community—the whole American Nation. We must get ships into our thinking, planning, and work, just as we have got railroads into the American consciousness.

When the war ends, there will be work for ships all over the world. Peace will soon make the British mercantile marine as strong as ever. The Norwegians and Japanese are building ships. The Germans will undoubtedly rebuild their mercantile marine. So it is possible to look ahead and see times coming when we must compete with these nations. And we shall never hold our own unless both our ships and our foreign trade are organized along the efficient delivery lines that facilitate business at home.

We must have ships running to all our customers in Latin America, the Pacific, and Europe on regular delivery schedules. Germany had the greatest international department-store delivery system in the world before the war. See how her merchant marine was tied up in foreign harbors. The Hamburg-American line had in 1913 a total of 192 ships, and with these ships it covered 74 regular steamship routes. The North German Lloyd had 133 ships, and its regular routes covered practically the whole world. British shipping is on the same basis of regular routes and regular deliveries. We would not undertake to give service to customers at home without our fast freight lines, express facilities, and special cars for special goods. We cannot hope to get close to foreign customers, and keep close, and give service, unless we organize our new ships to run on regular routes and embody the idea of regular service into the new foreign trade which we must build.

Regular service on regular steamship routes will be vitally necessary if we are to hold our own either in shipping or export trade.

The other day a steamship man in my office painted a somewhat gloomy picture of after-war shipping rivalry. Our war wages and higher costs would make it impossible to compete with British, Japanese, Norwegian and German ships, he feared.

"Suppose we run our ships on regular lines to all foreign countries where trade can be built," I suggested. "Suppose that instead of keeping the traffic on a basis of cheapness and irregular sailings, we extend our fast railroad freight service to the ocean, and afford American business men the same facilities for reaching customers abroad. Suppose we also carry passengers on combination cargo and passenger ships, and make it easy for those customers to visit our markets, just as the

southern and western merchants visit Chicago and New York. Would that overcome the disadvantages of cheap ocean competition?"

"That is our only salvation," was his reply.

It is not only our big opportunity for holding our own in shipping competition, but it is the only business-like way to build up foreign trade. You may take past statistics of our foreign trade to different countries and see regular delivery service and export trade growing together. Because steamship service to Europe was on daily schedule we were able to deliver our goods to customers there as regularly as we sent them over the border to Canada by our railroad service. Because West Indian and Central American countries could be served by our coastwise ships on regular schedules we built lasting and growing trade with these neighboring nations. And on the same principle, because our steamship service to South America, Australia and the Orient was irregular, when it existed at all, and in the control of competitors reaching those countries by regular lines, our sales were spasmodic and unbalanced by return shipments of raw materials.

Now we are rapidly building the mechanical equipment for regular steamship lines all over the world. The fast troop ship can be converted for combined passenger and cargo service and placed on regular lines, reaching the whole of Central America, South America, the Pacific, and the British Colonies. We shall undoubtedly have our own liners to Great Britain, European, and Medi-

terranean ports. Our refrigerator ships, now carrying meat and dairy products to feed the Allies, will carry meat, fruit, butter, eggs, and perishables to other countries. Our cargo ships can be organized on the triangular system, which has made British and German shipping profitable. That is, a British ship left Wales with a cargo of coal for South America, picked up a cargo of nitrates for the United States, and returned with a cargo of wheat to England. Thus British export and import trade were both facilitated, and on the third leg of the triangle the British ship did a delivery job for a foreign nation, thus adding to tonnage and revenue. If 25,000,000 tons of American shipping can be kept busy in our own export and import trade, then the development of this third leg in the triangle will keep 30,000,000 to 35,000,000 tons of American shipping employed. That is the tonnage which I estimate will be needed by the United States after the war.

To keep this great new merchant marine busy we must have a radical change in American business thinking. Every manufacturer and trader in the United States, every banker, farmer, miner, and consumer must begin to think now about American merchant ships as a great modern international delivery service. No longer must we be content to let our railroads stop at the ocean—they must be extended to reach clear around the globe.

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Machining Crank Shafts

By Frank A. Stanley,

Member American Society of Mechanical Engineers

MACHINE shop practice in the handling of crank shafts varies in different localities and still further varies in any given section in accordance with the size of the work, the design of the shaft, and the character of the rough material as it comes to the shop.

Where closely formed drop forgings are available, as with many kinds of smaller sizes of crank shafts, much labor and machine work in the shop is eliminated and the general system of manufacture is entirely different from that followed where, as is often the case, the finished work is produced from roughly hammered forgings, or again from plain slabs, which, while hammered down at the ends, are yet in such form as to require heavy machine operations at all points before they assume the outline of a crank shaft.

With the heavier sizes of shafts there is, of course, less possibility of working down the rough shaft in forging dies, but at the same time such shafts are often forged under the hammer to remarkably close lines for work of such size and general contour.

The accompanying engravings may be of interest as illustrating characteristic methods of handling various kinds of shafts in a number of different plants on the Pacific Coast.

The view in Fig. 1 shows a five-throw shaft, 11 feet long, 5¼ inches diameter, for a four-cylinder Diesel engine, the fifth throw seen at the front being used for operating the compressor. The turning of the main bearings of such a shaft is

accomplished with the same degree of facility as if the throws were all in one plane. But for the pin-turning operations the additional throw at right angles to the other four requires a pair of lathe fixtures in which provision is made for securing three offset positions for the work, corresponding to the angular relationship between the fifth crank and the others.

Thus two of the offset centers on the chucks which carry the work on the lathe centers would be on the same center line but equi-distant at opposite sides of the center. The third center in each chucking fixture would be located at right angles to the line drawn through the first two centers referred to.

For smaller sizes of crank shafts, lathes are sometimes specially equipped with heads carrying holding fixtures, which, after the work is once chucked, can be set or indexed through any necessary angle to give the correct position for the respective pins. In Fig. 2 an arrangement of this character is shown, with a four-throw crank in place for the turning of the pins. These shafts, it will be noticed, are drop-forged closely to size, only about one-fourth inch of metal being left by the dies for turning down in the lathe.

Where crank shafts are not forged out in the throws, the problem of getting rid of the stock between webs before the pins can be turned involves some interesting processes. Sometimes the webs are drilled with a series of holes closely spaced and outlining fairly closely the block of



Fig. 5. Planing operation on a crank shaft.

steel which is to be knocked out after the drilling is completed. Sometimes the holes are drilled only along the bottom line for the web and the job then placed in the power saw or cold saw, where the side cuts are made to run down into the drilled holes and thus allow the piece of metal to be removed. Where these side cuts are made in a power hack saw, it is the practice in some shops to carry two saw blades in the machine by means of a special head and so permit the two cuts to be made



Fig. 4. Cranks cut out in the web by the oxy-hydrogen torch

This shaft is 9 inches thick through the web, the gap cut out by the torch being 6 inches wide by 8 $\frac{1}{2}$ inches deep. In other words, the length of cut made to remove the block of steel and so outline the inner sides of the webs is equal to twice 8 $\frac{1}{2}$ inches plus 6 inches, or a total of 23 inches, and the area of the section cut out by the torch equals the above figure multiplied by 9, or 207 square inches.

A better idea of this is obtained from Fig. 4.



Fig. 6. Grinding crank pins.

simultaneously, this saving half of the time expended with the single saw.

With heavier shafts especially, the flame-cutting head is found very serviceable in many shops. Thus Fig. 3 shows an oil engine shaft as it appears after the webs have been roughed out by cutting out of the material between by application of the oxyhydrogen torch.



Fig. 2. Turning crank pins.

which shows two of the solid blocks of metal as removed by the cutting torch. The view also gives a good idea of the reasonably smooth surface obtainable by careful application of the flame.

The apparatus used for such work may consist of a base plate carrying a movable slide for the cutting torch or head and a feed screw for traversing the slide and cutting head along the required path. The fixture is clamped to the face of the



Fig. 1. Crank Shaft for Diesel engine.



Fig. 3. Turning large crank shaft for oil engine.

crank, with the head in line with the cut to be made, and then by means of the screw the cutting head is fed steadily across the job. With the fixture once set, it takes only a short time to make the cut around the work, and two operators can cut out four webs of the kind shown in a half a day's time, including the setting up of the apparatus, adjusting, etc.

The photograph in Fig. 5 shows a planing operation on a similar crank shaft after the lathe work is completed, the operation here consisting of securing the work to the side of a large angle plate for the finishing of the flat ends of the webs which serve as counterbalances.

The grinding machine is coming into use in numerous places for the finishing of shafts and crank pins, and much time is saved by this type of machine, which not only accomplishes results very rapidly, but further gives an assurance of accuracy in results not easily obtainable by other means.

A multi-throw crank shaft is seen in Fig. 6 on a

modern grinder with a large wheel in operation on the pins, which are brought to exact size in remarkably quick time. For example, the shaft illustrated, which has a pin diameter of 2 15-16 inches, is ground on the four pins in about one-half hour. The turning operation on the pins, which precedes the grinding, is performed in a little over an hour, the lathe tool leaving about 0.020 inch for finishing in the grinder. The pins are held to a limit of accuracy of 0.001 inch in the grinding machine.

A grinding wheel 40 inches in diameter is used on this work, the wheel face being nearly as wide as the pin, so that the wheel is first fed straight in to depth, as indicated in Fig. 6, and then moved sidewise to finish out the fillet at each side.

The main bearings of the shaft are also finished by the grinding process in another machine, but with quite similar conditions as to amount to be removed by the wheel and limits of accuracy required in the finished work.

Manning the New Merchant Marine

How the United States Shipping Board is Training Deck and Engineroom Officers and Crews for the New American Ships

By Henry Howard,
Director of Recruiting, U. S. Shipping Board

PRESENT construction plans for our merchant marine call for more than 8,000,000 tons of new shipping to be completed within two years. At the beginning of the world war, August, 1914, seven nations were credited with more than 1,000,000 tons of shipping each. Great Britain headed the list with 19,799,119 tons, the United States stood next with 7,928,688 tons, Germany third with 4,892,416 tons, France 2,173,544 tons, Norway 2,425,476 tons, Sweden 1,114,048 tons and Japan 1,167,264 tons. Austria had less than 1,000,000 tons, with only 998,130. Of the tonnage of the United States, something more than 2,000,000 tons was available for deepwater service in the Atlantic.

The first year of the war was sufficient to show the United States that the process of attrition in the world's supply of tonnage, due to normal war causes and to the illegal use of the submarine by Germany, was creating a shortage of ships. This shortage became acute when the United States entered the war in April, 1917, thereby adding to the already pressing problem of logistics this country's vast needs of sea transportation for troops and supplies, and the quickened need of sending more and yet more supplies to our allies.

Urgency of Measures Understood

By the time this situation had developed, the nation, as a whole, understood the urgency of measures, long advocated by students of maritime conditions, residents mainly of the seaboard states, for developing our merchant fleets in accordance with the pressing demands of the times. Indeed, steps had been taken in that direction some months before, with the creation of the United States shipping board, by act of congress, in September, 1916.

In the following winter months the shipping board had been duly organized for business, and when the United States entered the war it was ready to exercise its functions as sponsor for a new, nationalized merchant marine. The powers conferred on the board by Congress were sufficiently broad to enable it to take sweeping steps toward the desired end, and to insure the accomplishment in a few months or years of war time of what would not, and probably could not, have been accomplished in generations of peace.

Immediately after the country had become a party of the war, suggestions poured in on the shipping board as to ways and means of adding largely and rapidly to the nation's tonnage in merchant ships. One plan early adopted called for the building of 1000 wooden vessels, to carry cargo across the Atlantic, and offset, in large measure, the destructiveness of the German submarines. It was with the adoption of this plan that the shipping board took first steps in a construction program, afterward greatly enlarged, intended to produce several million tons of merchant shipping in record time.

Coincident with the sudden awakening of the nation to the vital need for more cargo ships, and the energetic initial steps of the shipping board to produce them, came forward the important question of manning the new merchant marine so soon to come into being. The country as a whole not having been accustomed in recent times to think in terms of shipping, appeared doubtful of its ability to produce the mariners needed to handle its new fleets. We were no longer a sea-going people, said the doubtful; we had lost the art of the sailor when the American square-rigged ship went out of use as a leader among the world's

cargo carriers. Surely, our war need was pressing enough to appeal to the patriotism of Americans with a liking for the sea, but would any considerable numbers come forward for service on merchant ships?

These questions reflected a natural condition in the public mind, which as yet was unable to visualize the merchant marine in true perspective as one of the primary arms of the country's new equipment for progress. Relatively few men having knowledge of maritime affairs and a broad view of the trend of events in the world war, were able to grasp both the needs of the hour and the means of meeting them, and to take an optimistic view of our country's ability effectively to turn back to the sea, where it won its first laurels in commerce. Such men there were, however, in the United States shipping board, as I learned on approaching that body with a plan for manning our new merchant fleets.

Formulates Plan Early

It had been my good fortune to be reared in a New England community in which shipping was a subject of common knowledge, and to have made some study of cause and effect in the condition of our merchant marine as it was at the opening of the war. By the time the United States cast its lot with the allies, I had formulated a plan for manning the new ships that we must build to win, and when Congress declared that a state of war existed I laid my plan before the shipping board.

It provided, in brief, for a training system to prepare Americans for service on American merchant ships, the work to begin with the training of officers and eventually to extend to the training of crews. I pointed out to the board that there were many thousand fishermen on our coasts, there being not less than 100,000 on the Atlantic and Gulf seaboard alone, among whom could be found excellent material for merchant officers and sailors. Furthermore, former sailors were to be found in almost all the states, engaged in various occupations. Among them were former captains and mates of sailing vessels and not a few former officers of merchant steamers. There were also many marine engineers working ashore, and other engineers who could be prepared in a short course of special training for service at sea. By establishing free schools in navigation at important ports, and free classes in marine engineering at some of the leading technical colleges, I proposed to train enough men of the types indicated to meet the forthcoming increased demand for American deck and engine room officers for the new American cargo ships. I proposed reaching the men needed by statements in the press of the opportunities thus offered them for patriotic service and a chance for advancement in positions that would be as numerous after peace returned as during the war.

On May 29, 1917, I was authorized by the shipping board to inaugurate the training plan, and on June 1 was sworn in as director of recruiting service for the board. Three days later the first free navigation school to be conducted under the direction of the United States shipping board was opened, with twenty students, at the students' astronomical laboratory, Harvard University, kindly loaned for the purpose by the college faculty. Later this school was transferred to the Massa-

chusetts Institute of Technology, where it has since been maintained.

The work of organizing additional schools went on through succeeding months, until forty-one in all were established on the Atlantic, Gulf and Pacific Coasts and the Great Lakes. The response of men qualified to enter the schools was quick and gratifying as to numbers, and, notwithstanding that no man was accepted as a student who had not served two years on a deep-water vessel, the percentage of men who qualified for admission, out of the total number of applicants called for preliminary examination, was large. Many of the applicants, actuated by patriotism, expressed a willingness to leave lucrative positions ashore in order to fit themselves for service in the merchant marine in war time. Others frankly hailed with delight an opportunity to get back to the sea, which they had left because of unpromising conditions in the decade preceding the opening of the great war.

National headquarters of the new training service were established at Boston, where a floor in the Boston custom house was set apart for its use by the treasury department. For administrative purposes in establishing and maintaining the schools the country was divided into sections, following closely the geographical divisions employed by the United States steamship inspection service, which from the first co-operated heartily with the recruiting service of the shipping board in maintaining the standard set by the regulations of the department of commerce as to the experience required of a candidate for a merchant officer's license.

Each section was placed in charge of an official designated as section chief, in whose hands were placed all details as to the administration of the schools in that section. The board was fortunate in securing as section chiefs men of professional or business training, whose patriotism led them to donate their time to this service, their compensation being merely nominal—in most instances five dollars a month. Important positions at national headquarters also were filled by volunteers with special capacity for administrative work. The section chiefs of the service are as follows: Section I, Horatio Hathaway, Jr., twelfth floor, custom house, Boston; Section II, John F. Lewis, 108 South Fourth street, Philadelphia; Section III, Hardy Groom, 130 Riverside avenue, Jacksonville, Fla.; Section IV, Ernest Lee Jahncke, 814 Howard avenue, New Orleans; Section V, Farnham P. Griffiths, 465 California street, San Francisco; Section VI, William J. Grambs, 860 Stuart building, Seattle; Section VII, Captain Irving L. Evans, 933 Guardian building, Cleveland.

Direction of instruction in the navigation schools was placed in the hands of Prof. Alfred E. Burton, dean of the Massachusetts Institute of Technology, who was formerly connected with the coast and geodetic survey, and who is a practical navigator of wide scientific knowledge. Professor Burton selected his instructors from among men of practical training, astronomers, explorers, and former sea captains being among them, with recognized standing as teachers.

The system of instruction perfected for the schools was in accordance with the most approved methods of teaching navigation. It was therefore possible to impart to a student in six weeks' study

a groundwork of the theory and practice of navigation to enable him to pass the examinations of the United States steamboat inspection service, entitling him to a license as a second or third mate. The examinations were conducted without any modification of the regulations, applying to ordinary applicants for a license. After they had been passed the student in need of practical experience on a steamer was sent to sea in the capacity of a reserve officer, for a period of two months, to learn the ropes before actually assuming the full responsibilities of the position for which he was licensed. During this period he was paid \$75 a month. Afterward he received the usual pay for his grade in the merchant service.

Since the opening of the first school in navigation by the recruiting service of the shipping board, thirty-nine others have been opened, as follows:

*Machias, Me., Rockland, Me., *Boothbay Harbor, Me., Portland, Me., Gloucester, Mass., Cambridge, Mass., *New Bedford, Mass., Provincetown, Mass., Providence, R. I., *Greenport, L. I., New York City (2), Atlantic City, N. J., *Cape May, N. J., Philadelphia, Baltimore, *Crisfield, Md., Norfolk, Va., *Newport News, Va., *Wilmington, N. C., *Charleston, S. C., *Savannah, Ga., Jacksonville, Fla., Tampa, Fla., Mobile, Ala., New Orleans, Galveston, Tex., San Diego, Cal., *San Pedro, Cal., Los Angeles, San Francisco, Portland, Ore., *Astoria, Ore., Bellingham, Wash., Tacoma, Wash., *Duluth, Chicago, Cleveland, Buffalo, Detroit.

The graduates from these schools, in the ten months from June 1 to April 1, numbered 1500.

Engineering Schools

The development of the engineering schools was contemporaneous with that of the schools in navigation. The training of engineers was placed in the hands of Prof. Edward F. Miller of the Massachusetts Institute of Technology, and classes were established at the following places:

Massachusetts Institute of Technology, Cambridge, Mass.

Stevens Institute of Technology, Hoboken, N. J.

Bourse building, Philadelphia.

John Hopkins University, Baltimore.

Tulane University of Louisiana, New Orleans.

Case School of Applied Science, Cleveland.

Armour Institute of Technology, Chicago.

University of Washington, Seattle.

The school at Hoboken was later discontinued, and one was started at the Seamen's Church Institute, New York City.

The course in the engineering schools is of one month's duration. The qualifications for admission to these schools differ slightly from those required for admission to the navigation schools, as men with proper technical experience are admitted who may require as much as six months' added training at sea before becoming eligible for licenses.

Experience required for an applicant to qualify for admission to enter one of these shipping board engineering schools is classified as follows:

Three years as fireman, on ocean coastwise steam vessel.

Two years as oiler or watertender, or combined service of two years in these positions.

Six months as chief or assistant engineer, on lake, bay or sound steamer.

One year, chief or assistant, river steamer.

* Only one term was held, which is now concluded.

One year as locomotive or stationary engineer, with six months' sea service, which may be obtained after finishing school course.

Graduation from engineering class of nautical schoolship.

Graduation in mechanical engineering from a technical school, with six months' sea service.

One year in charge of stationary plant of not less than 1000 horsepower.

Three years as apprentice to machinist's trade, with six months' sea service.

About 1200 marine engineers were graduated from the shipping board free engineering schools in the first ten months of their existence. Like the deck officers graduated, all were American citizens.

One noticeable effect of the recruiting service's call for Americans qualified to serve as officers in the new merchant marine, was the stimulation given men qualified to take examinations for licenses, without special schooling. Large numbers of such men, excellent mariners and citizens, secured licenses on their own initiative, without attending the shipping board schools, as is shown by the unprecedented number of licenses granted from June 1, 1917, to February 1, 1918, by the steamboat inspection service. Not less than 3600 original licenses were issued in that period, including those issued to the men specially trained by this service, while not less than 900 licenses were extended or transferred from fresh waters to salt; while to April 1, 1918, the number of new and extended licenses was more than 5000.

The Sea Service Bureau

As a necessary adjunct to its training service for officers, the recruiting service in July, 1917, established a department whose functions are indicated by its title, the sea service bureau. Graduates of the schools were placed on board ship by this department, at first entirely through co-operation of private steamship interests, and later also on ships controlled directly by the shipping board. The work of this bureau showed at an early stage of that without the supply of officers created by the shipping board schools there would have been at times in 1917 a shortage of mates and assistant engineers for American merchant ships, even before the shipping board's construction program began to bear the fruit of new vessels in commission.

Representatives of the sea service bureau were established in various important ports, and the bureau exercised increasingly broadened functions in placing American officers, and also crews, as the demand for them increased with the launching of increased numbers of merchant ships.

Training Merchant Crews

By the autumn of 1917 the construction program of the United States shipping board by which considerably more than 1000 new ships will be commissioned under our flag had advanced sufficiently to warrant the development of the second phase of the training plan originally submitted to the board for manning the new merchant marine—namely, the training of crews.

During the period devoted exclusively to the training of officers, I had received such a large number of communications from young men without sea experience, asking if provision was to be made for training men of their type for service in merchant crews, that I became convinced there would be no difficulty in securing all the material

needed to man our new merchant ships with all-American crews. These communications came from all sections of the country.

Much thought was given by the recruiting service staff to working out a system of intensive training for crews, by the use of a squadron of training ships. In December, the shipping board approved the resulting detailed plans, and on December 12, 1917, announcement was made in the press that the recruiting service was prepared to receive applications from young Americans between 21 and 30 who wished to be trained for service on merchant ships as sailors, firemen, coal-passers, oilers, water-tenders, cooks and stewards. In the three months following this announcement more than 7500 applicants sent their names to the recruiting service headquarters.

The number of men required for this branch of the training service was at first estimated to be 85,000, but events subsequently led to a modification of this figure. The transportation of an immense American army to France, and of its supplies, called for the taking of a great many ships from the merchant marine. The need of arming all ships entering European waters with naval guns led to a proposal that all ships crossing the submarine zone be manned by the navy. After several conferences on this point between officers of the navy department, the war department—then operating the troopships—and the shipping board, a decision was reached by which control of troopships, animal transports and freighters carrying unbroken cargoes of munitions and supplies for military uses were placed in control of the navy, to be manned by naval crews, while Atlantic passenger liners, freighters with general cargoes for our allies and all merchantmen plying outside the war zone, were left in the control of the shipping board.

This arrangement imposed on the shipping board the work of training many thousands of young men for crews on these vessels.

Work in training the new crews was begun the day the board's authority was granted me to proceed with the plan. To administer the training service a department was created, termed the sea-training bureau, with a supervisor in charge.

For the training squadron two steel screw steamers were at once secured, the "Calvin Austin" and the "Gov. Dingley", twin ships, formerly in the passenger trade on the New England coast, each being of 3800 tons gross register, 299 feet long and 60 feet wide, with reciprocating engines and 2700 indicated horsepower. Each vessel had a rated capacity for 780 passengers. Being speedily converted into training ships, the vessels each had capacity from 500 to 600 apprentices. Because of the large number of applicants, it was possible to select superior material for their complements, which filled rapidly in the first weeks of 1918.

While these two ships were being filled, a third was being fitted out at Newport News, Va. This was the former transport "Meade," ex-City of Berlin, a graceful old Atlantic liner, with a sound hull and capacity for something more than 1200 apprentices. It was planned to take this ship also to Boston, to be used as a station ship, while the other two made frequent training trips to sea. Later a fourth ship, the "Gov. Cobb," of the type of the two first named, was put into the training squadron, and plans were put on foot for placing

a training ship on the Pacific Coast and another at New Orleans.

The training course is of an intensive character. There is an instructor to each ten apprentices, and he is held responsible for the progress of his group. The apprentices virtually go to school all day, and every day, except Sunday, during their stay on the ship, which is not less than a month in any case, and will probably exceed two months in few.

Daily routine followed by the first classes for sailors on board the ships was as follows:

- 6:00 a. m. All hands tidy room.
- 7:00 a. m. Breakfast.
- 8:00 a. m. General work.
- 9:30 a. m. Discipline, instruction.
- 10:00 a. m. Inspection.
- 10:30 a. m. Boat drill.
- 11:45 a. m. Clean up.
- 12:00 noon. Dinner time.
- 1:00 p. m. Fire drill.
- 2:00 p. m. Steamship.
- 3:00 p. m. Boat drill.
- 4:00 p. m. General work.
- 4:45 p. m. Clean up.
- 5:00 p. m. Supper.
- 6:00 p. m. Muster and liberty.
- 6 to 9 p. m. Recreation, bathing, etc.

Recreation includes singing, for each ship is supplied with a piano. The musical program includes old-time chanties, in which the young men are instructed by a veteran deep-water chantie man.

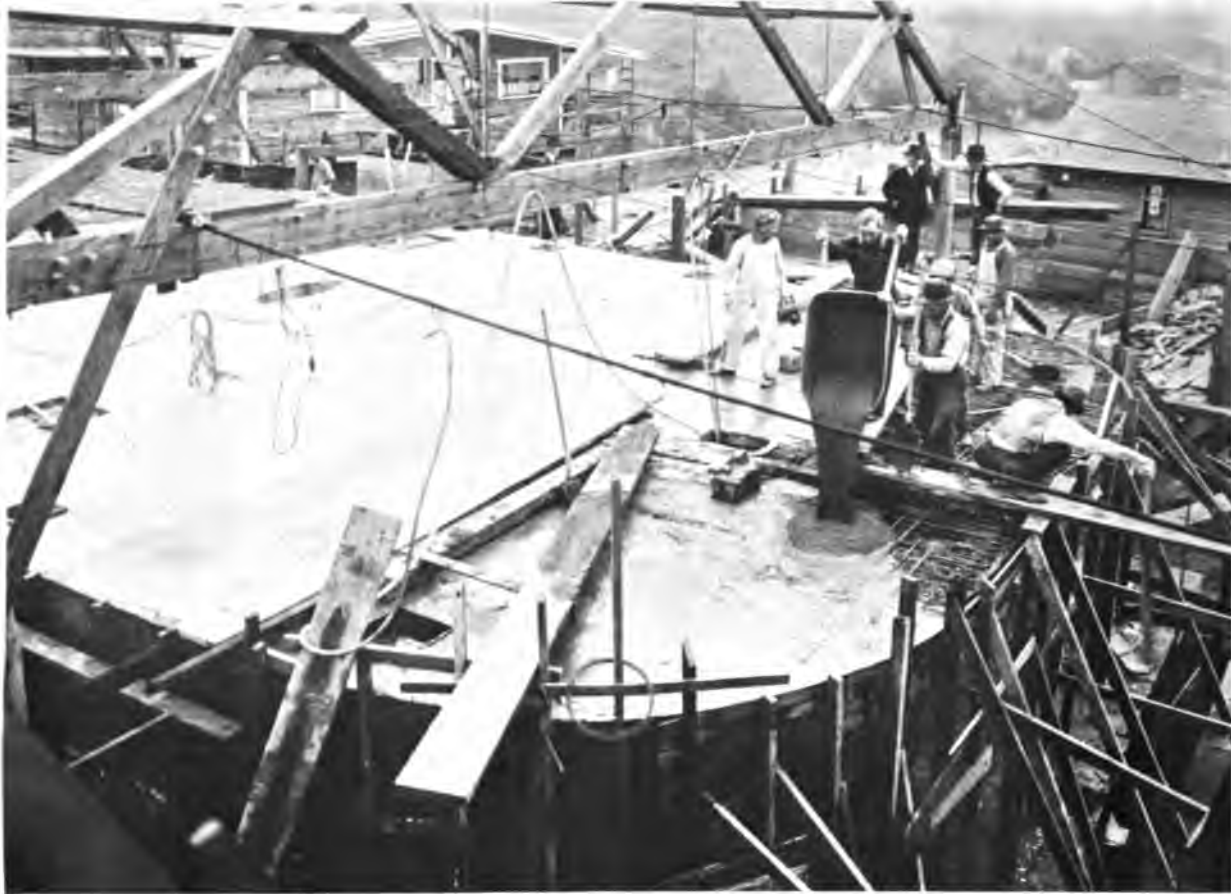
When the apprentices have finished their intensive training, they are added to regular crews in the merchant marine, on a given ratio to the experienced men carried. By this method it is expected that no difficulty will be experienced in securing full crews for all ships added to the merchant fleet by the shipping board, as well as for any existing ships that may need men.

In perfecting a plan for enrolling apprentices for its training ships, the recruiting service availed itself of the offer of a patriotic citizen of Boston, Louis K. Liggett, head of large interests in the drug trade, controlling nearly 6900 drug stores, in 6393 cities and towns. These stores were placed at the disposal of the recruiting service for use as enrolling stations. The stores in New England, numbering 526, were first used for this purpose, with signal success, followed by those in New York, New Jersey, and Pennsylvania.

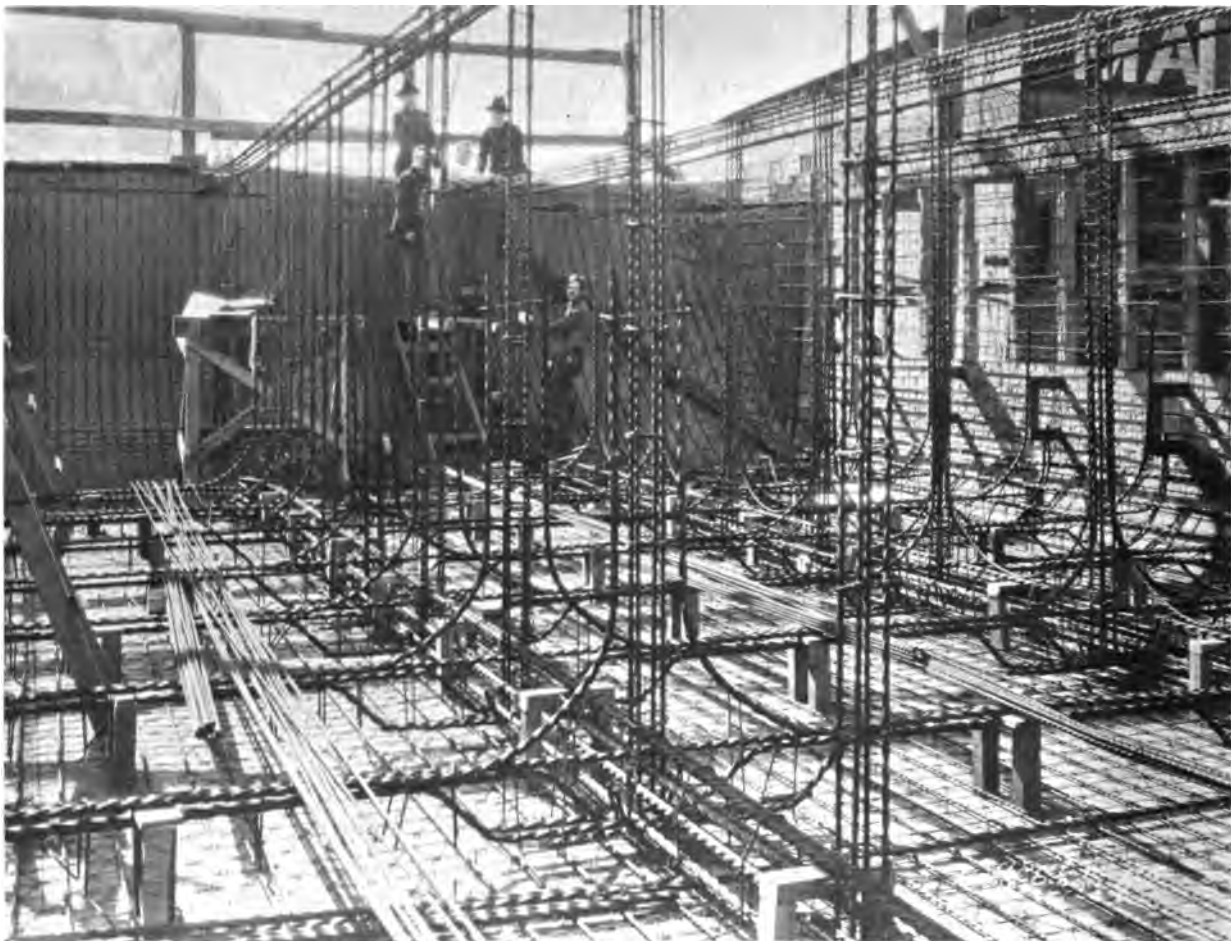
OUR COVER

Our cover this month was made up from a particularly attractive photograph of the launching of the "West Ekonk," one of the 8,800-ton dead-weight carrying capacity freighters recently launched by Skinner and Eddy at their original Seattle plant. The frequency with which these big fellows are being slid overboard along the Pacific Coast is one of the most gratifying of the many splendid war production records that are being made throughout the length and breadth of the country.

It was not only the launching of many such craft which pleased Mr. Charles M. Schwab on his Fourth of July visit, but also the fact that these launchings were not in the nature of a mere record-making attempt, as a study of the launching list found elsewhere in this number will show that many vessels were launched either a day or two before or a day or two after the Fourth.



Work on the Inter-Ocean Barge and Transport Company's concrete barge June 8, 1918, finishing the deck pour.



Condition of the same barge on April 19, 1918, showing general arrangement of major reinforcements.

A Large Concrete Barge

By W. L. Hill, Jr.,
Assistant District Engineer, Portland Cement Association, Seattle, Wash.



Progress view of nose of barge with main stringer steel in place. Slab rods and mesh to be carried up later.

FORESEEING the demand for a commercial substitute for wood and steel vessels of all types, the Inter-Ocean Barge and Transport Company of Seattle, which controls the construction of a patented type of wooden hull, has recently turned its attention to concrete as a ship-building material, and has launched its first concrete vessel—which is also the first to be launched in Seattle—a 550-ton deckload scow, 114 feet by 34 feet by 9 feet 6 inches. As this is being written, the scow is docking at the end of its first voyage—a two hundred mile tow from Blaine, Wash., loaded to within a foot of its deck with box shooks, and reported to be behaving perfectly.

In undertaking the design and construction of concrete ships, Mr. W. C. Muldrow, consulting engineer for the I. O. B. & T. Co., decided upon the scow as the most readily analyzed form of commercially useful floating structure and therefore as the most suitable form of vessel from which to gain the information of experience. Notwithstanding the apparent simplicity of the design and construction of a rectangular scow, Mr. Muldrow went at the problem exactly as he would have gone at the design of an ocean-going carrier, which lends a deal of interest to the boat.

In the preliminary designs, the assumptions usual to marine practice were used. Overall bending moment was taken at W. L. divided by 30, which is common in ship design, but considerably greater than the stress assumed by the U. S. Navy for its concrete scows; the side and bottom slabs were computed to take care of hydrostatic pressure at full immersion of the vessel, with the addition of 50 per cent for shock except at the heel of the ends, where 100 per cent was added; collision bulkheads were provided at each end, and the hull divided into six main compartments with all bulkheads figured to carry from either side a head of water up to the deck.

At first, three longitudinal bulkheads were contemplated, but consideration of the comparative weights caused this plan to be abandoned in favor of one central longitudinal bulkhead and two lines of concrete stanchions spaced four feet on centers

and supporting deep fore and aft stringers which frame into the main cross members at every four-foot interval.

The frames, spaced every four feet, are continuous around the hull, framing into the deck beams, floor beams, stanchions and bulkhead stiffeners with ample knees, which add materially to the strength and stiffness of the structure. Side frames are calculated to carry the 9 foot 6 inch by 4 foot panel of the sides at full immersion; floor beams are designed to carry hydrostatic loading of the bottom panels, which are 4 feet by 8 feet 6 inches; and the deck beams are figured to take the total load of the barge, distributed over any one-quarter the area of the deck. The 50 per cent allowance for shock was also made in figuring beams and slab on deck.

Five longitudinal stringers in both deck and bottom carry the main reinforcements for resisting hogging and sagging stresses, and this system is thoroughly connected with the main members of the transverse framing by knees or gusset plates, each carrying one $\frac{3}{4}$ -inch bar, bent on a long radius and heavily stirrured.

Ample stirruping and shear bars are features maintained throughout the design. With slab thickness of but $3\frac{1}{2}$ inches throughout, live loads ranging up to 1000 pounds per foot and very prob-



Detail of steel in nose at junction of stanchion line and floor girders.

able shocks of unknown intensity or direction to be met, provision against shear, and also against the excessive web stresses set up in the sides of the vessel, in the center bulkhead, and in all beams, becomes the determining factor at many points.

Notwithstanding that lightness is so much a feature to be desired, and although a fairly comprehensive series of cylinder tests of the mix and aggregate proposed to be used had shown compressive strengths of concrete well in excess of 5000 pounds per square inch at thirty days, it was considered better to be safe than sorry in a first trial, and very conservative stresses were adopted. Concrete is stressed at 750 pounds in compression, and the reinforcements—billet steel, structural grade—are designed for stresses of 12,000 pounds per square inch below water and 16,000 pounds on deck.

Concrete was poured between forms which were built up around the steel in much the usual way, great care being taken to have it thoroughly settled and compacted, and no joints being allowed at any point below deck. The pour was continuous up to the springing line of the upper system of knees, no concrete being allowed to become more than twenty minutes old before fresh concrete was placed upon it. The result justifies the extra expense. Both inside and out, the concrete is perfect. No waterproofing, either integral or applied, was used, but, to quote the tugboat captain who went through the scow very thoroughly after it was loaded at Blaine: "I could bail her out with my pocket handkerchief and only have to go on deck once."

The construction throughout is as nearly perfect as it could be made, and already the scow has been tested mechanically, both as to design and construction, by an accident of a sort which seems to follow in the wake of concrete ships of all sizes. The ways, apparently amply strong to carry the weight of the boat, failed during launching, allowing one end of the scow to fall to the beach, while the other was hanging in cantilever, the center of the boat being supported hit-or-miss on the several jagged ends of the way timbers. She hung there for two days, with the tide shifting the lower end about, and was finally jacked into the water with no visible damage done except one minute crack on deck, which started at a manhole frame amidship and extended for about four feet directly



Detail of steel reinforcing at bulkhead stiffener and floor girder.

across the boat. It is invisible now and was never visible on the under side of the deck, indicating that it extends downward only as far as the steel.

Her further performance will be watched with great interest, for as the pioneer in Seattle's proposed program of concrete shipbuilding, No. 1 is quite a local celebrity; and although her first trip has suggested minor changes in the form of succeeding barges, she is worthy of the tireless effort and vigilance which it cost to build her, and the lessons learned during her construction and still to be learned from her behavior will be of real value to the new industry as well as to her builders.



Newly completed concrete barge of the Inter-Ocean Barge and Transport Company tied up at her dock.

The Possibilities of the Large Wooden Ship

SHIPBUILDERS of the Oregon District of wooden ship construction of the Emergency Fleet Corporation have won signal recognition from Charles M. Schwab, director general, and Charles Piez, vice-president and general manager of the Emergency Fleet Corporation, through being authorized to send a committee to the Philadelphia headquarters with a design for a 5000-ton all-wood steamer.

Such a design had been worked out in advance of the coming of the Schwab party under the direction of Lloyd J. Wentworth, supervisor, and J. W. Hall, assistant supervisor, of the district. Mr. Piez said, during a conference with the wooden builders July 15, the corporation's technical department was at work on a 5000-ton vessel, the original of which was the Dougherty type, and that information he received after reaching Oregon was that the ship would require 50 per cent of the material to be brought from the Northwest in the way of timbers and long stuff.

E. W. Wright, manager of the McEachern Ship Plant, at Astoria, was selected to make the presentation to the officials on behalf of the Oregon builders. He spoke as follows:

"Our distinguished guest, in his speech at last Saturday's luncheon, among other interesting things told us that the country was still in need of ships and ships and more ships. Nothing in his attitude or in the inspiring sentiments he has expressed indicate the slightest intention to make any discrimination against any type of ship that can aid in moving the world's ever increasing tonnage.

"On behalf of the wood shipbuilders of this district, I am here to state that we are prepared to supply, in large numbers, first-class wooden steamers of any required size up to 5000 tons. With the finest material on earth for wooden ship building and with skilled workmen of steadily increasing efficiency, we can build an immense fleet of first-class wooden ships in a comparatively short time.

"I am using the word 'build' advisedly, for in making that statement I am reminded of an incident which happened while I was on a recent trip to a shipbuilding region, some thousands of miles away from the Pacific Coast.

"As I was strolling along the waterfront, my attention was attracted by a new wooden vessel whose uneven decks resembled an old-fashioned corrugated washboard. Her hatch coamings were not at all neighborly, as they had pulled away from each other at the corners, and the uneven planking seams had apparently disgusted the oakum, which was crawling out in a hundred places.

"Where was that craft built?" I asked of an aged sailor man, who was gazing at her in disgust. 'Built? Hell,' said he, 'she wan't built nowhere; she was jes' rafted together at old Blank's yard, up the river.'

"Now, we do not intend to waste any of our fine timber in that kind of construction, but will turn out the best wooden ship that can be built. In order to get these ships out rapidly and in great numbers, however, it is highly essential that we have some definite understanding as to what is expected of us. To make the best arrangements for material, men and equipment, we should be

given ample time to plan our share of the building programme.

"As the Pacific Northwest is the home and habitat of the wood ship, I would like at this time to make it clear that we have never regarded this ship as any more of an emergency craft than the steel ship.

"Oregon has been in the wood ship business a long time. It was seventy-seven years ago, down on Swan Island, almost within a stone's throw of the present plant of the Peninsula Shipbuilding Company, that Joseph Gale built the schooner Star of Oregon. Her keel was a single stick, hewn from a stately fir that grew on the bank of the river, where Portland now stands. Planking and decks were whipsawed lumber, and in due season Oregon's first wooden ship sailed away, going first to San Francisco and from there to the Hawaiian Islands.

"Forty-four years ago, down on Coos Bay, where two modern shipyards are now building vessels for the Emergency Fleet Corporation, A. M. Simpson built the full-rigged ship Western Shore. On her maiden voyage this vessel carried wheat from San Francisco to Liverpool and returned with general cargo, making the round trip of about 30,000 miles in 205 days, a sailing ship record that was never equalled by a metal ship.

"Since those old days, there has been an endless procession of wood vessels leaving North Pacific ports and they have done so much for us that instead of regarding them as emergency make-shifts, we consider them permanent necessities.

"We can build and operate them, steam or sail, in competition with the metal carriers. They have always played a prominent part in our commercial development and they will continue to do so for an indefinite period after the close of the war.

"With full knowledge of what we can do in the construction and operation of wood steamships, we do not intend to make any promises that cannot be fulfilled. We know the limitations of the wooden ship as we know its advantages. We cannot successfully build Lusitanias in our wooden yards, but we can build and guarantee 5000-ton ships that will meet with the approval and the rigid requirements of both American and British Lloyds.

"In selecting a standard type of wooden steamship of greater tonnage than those which we have been building, we appreciate the fact that we must build something that is satisfactory to the government. Naturally, we all prefer a type of construction that will enable us to utilize to the fullest advantage the magnificent ship timber with which we have been favored.

"In other words, we would prefer not to have the quality of our ship impaired by attempting to standardize it with ships built where the available timber will not admit of the best class of wood construction. We would rather have the other fellow try to build up to our standard than for us to be obliged to build down to that which a poorer timber supply compels him to adopt.

"When I speak of our standard, I mean the best ship that can be built from our high-grade timber. We do not want to cut that splendid timber into small pieces in order to meet specifications pre-

localities where good ship timber is available. Compelled to build a ship that does maximum strength which our Pacific timber could give it, we are aided by the wooden ship to prove that objectors are to be put in this position, and temporary care is to be spared from his post, do not desire that Mr. Heyworth come to the earliest possible most earnestly for a personal inspection of our wood Pacific Coast and make a go over the plans with us.

material and that Mr. Wentworth and Mr. Heyworth have prepared it can use Pacific Coast timber to the advantage. We would like to have designed that because we know what can be the best possible ship material, and we are satisfied that such a ship will examine our timber and facilities for handling it, he will agree with us that the Pacific Coast wooden ship should stand in a class by itself.

"In thus asking consideration for a larger type of wooden steamer than we are now building, we are not taking any chances on failure. We are guarded and guided not alone by the skill and ability of our builders, but by past experience in construction and operation of large wooden steamers. Nearly forty years ago, the wooden steamship Great Republic, 378 feet long, 44 feet beam, and with a carrying capacity of more than 5000 tons, was in operation between Portland and San Francisco and between Portland and San Francisco. Not only was she a big carrier, but her wooden hull had strength sufficient to support machinery that gave her a speed of nearly twenty miles per hour in the river.

"Before and after the appearance of the Republic and for years after the metal ships became numerous, the wooden steamer continued to play a prominent part on most of the ocean highways and is still doing so.

"The durability of the wooden ship is another feature that has been time-tested. Owned on the Pacific Coast and engaged in the coastwise and off-shore trade out of Pacific ports are 350 steam and sail wooden vessels that have seen from twenty to sixty-eight years' service. Of this list sixty-eight have passed their twentieth birthday; fifty-three are from 20 to 25 years old; seventy-eight are from 25 to 30 years old; forty-six, from 30 to 35; forty-two, from 35 to 40; forty-four, from 40 to 45; ten, from 45 to 50; five, from 50 to 55 years, and still in service are three wooden sailers which were built 61, 65 and 68 years ago. In this list is the steamship Arcata, built in San Francisco forty-two years ago, and in her long career having tested her strength on every bar between Panama and Alaska.

"With anything like proper care and up-keep, most of these vessels are good for many years.

"It is a noteworthy fact that salt water, the very element that rusts and ruins the metal ship, is the best known preservative for a wooden ship.

"Prior to beginning work for the Fleet Corporation in our yard, we were building wooden motor ships for Norwegian owners and in every case the specifications, based on Lloyd's requirements, called for fifty tons of salt to be placed between the frames. These same requirements are made on all wooden vessels built for private owners and the

ship thus "pickled" will be staunch and sound for many years. In the up-keep cost, an occasional caulking and painting on the wooden ship is much cheaper than the endless chipping and painting, which must be kept up continually in order to prevent the salt water eating holes in the metal ship.

"There is so much at stake in this war that cannot be measured in dollars and cents or by any commercial yard stick that it seems almost inappropriate to touch on the commercial aspects of the situation, and yet, as in times of peace we prepare for war, there is much that compels us in time of war to make at least some preparation for coming peace.

"The country is now somewhat in the position of the man who rushes out of his store, leaving regular business to take care of itself while he assists his neighbor in extinguishing a fire that threatens to wipe them both out. We intend to extinguish that blaze that now threatens the liberty and safety of the world, and after that is done we are going back to the store to resume business. Then will we need ships, wood, steel, concrete, large, small, and medium size. The truth of that old adage that history repeats itself never had a better prospect for verification than in the shipping outlook that will confront us at the close of the war.

"When the Civil War ended, a big fleet of government transports were turned loose and many of them came around the horn to the Pacific Northwest. These old wooden steamers opened up new trade fields and aided enormously in the development of those already open. They ran to Alaska, to Central America, to Mexico, Hawaii and the Orient, and had the government at that time encouraged and protected shipping as it is now doing, our ocean prestige would never have been lost.

"It will require an immense amount of tonnage of all sizes and types to restore the commercial equilibrium of the world after the war closes. We wish to do our part in turning out this tonnage and we desire that the output of our yards be of a size and type best adapted to your present war needs and to the demands of the peaceful commerce that is coming.

"Five years before the war began, the late James J. Hill, master of transportation, made the remarkable statement that the business of the country was increasing so rapidly that it was imperative that the railroads immediately expend \$5,000,000,000 in betterments and equipment, this in the face of an increasing traffic at Panama and Tehuantepec. The extraordinary business due to the war is not needed to demonstrate that Mr. Hill was accurate in his predictions, and the close of the war will find our railroads swamped with traffic out of all proportion to the railroad facilities for handling it.

"Some relief from this inevitable congestion must be found in the water routes between the two coasts and the shipyards of the Pacific Northwest can supply tonnage to take care of a large amount of this traffic. Shortly after the completion of the Panama Canal, while passing along the Hudson River, I noticed an Oregon-built steamer discharging lumber at a port a short distance below Albany.

"That steamer was built at St. Helens, a few miles down the Columbia River from Portland, and the lumber from which she was built and the cargo she carried was all logged and sawed within ten

miles of the point where the vessel was built and her cargo assembled.

"There is no lost motion in this kind of transportation, and as this vessel and many others then in the trade with her brought return cargoes to the Pacific Coast, they aided materially in relieving the congestion of the railroads.

"There are immense possibilities for the development of this kind of traffic between the Atlantic and Pacific Coasts and no other craft is so well adapted for this trade as the economically built and economically operated wooden steamer of from 3000 to 5000 tons.

"I am here before you today as a representative of the wood ship builders. Regarding strictly from a mercenary standpoint our desire to build ships, it might be said that there was a selfish motive behind it. But behind this little bunch of ship-builders who are doing their best to do their bit in these dark days, are thousands of business men, and behind the business men, interested in the general welfare of the country, are millions of producers who will expect something from this war fleet after the immediate and all-important mission for which they are being built is fulfilled, and these thousands and millions of producers and business men do not care a rap whether the vessels are of wood, steel or concrete, so long as they deliver the goods.

"We want to use these vessels in getting into the rich trade fields from which the Huns have ousted themselves by their own folly and wickedness. No one ever heard of a cargo of copra reaching Portland prior to the war, but in the past year fourteen full cargoes have been received here, and more is on the way. These cargoes have been brought here from the South Sea Islands in Pacific Coast-built wooden vessels, which have taken this business that offers return cargoes for our lumber carriers, away from the Germans, and the volume would have been much greater had we had sufficient vessels to handle it.

"We must have ships if we are to keep this trade. We must have ships for the exploitation of new fields. We want to help in the removal of those "Made in Germany" signs that the unspeakable Vandals have sprinkled so liberally throughout the South Seas, in the Orient and in the Pan-American countries.

"We need more ships to carry the American flag and the trade that follows it into the numberless ports of the Far East, where more than 400,000,000 of the earth's population dwell.

"That immense shore line reaching from Vladivostock down through the China Seas and Bay of Bengal and on around up the Malabar Coast, is dotted with hundreds of ports for which the 4000 to 5000-ton steamer is much better adapted than the larger carriers. We want to get into these ports with both wood and steel vessels. We want to go on to Australia, to Africa, to South America and to all other countries on earth, in many of which we are now comparative strangers.

"We want to make the industrial and commercial conquest that will follow in war in keeping with the splendid effort that is now clinching for all time our proud title as 'the greatest country on earth.'"

F. C. Knapp, president of the Peninsula Shipbuilding Company, told the visitors of the lumber output of Northwest mills and that the allotment

he had made for ship construction would not detract from the amount of lumber available for other purposes. He offered the following interesting compilation:

"Fir production of sawmills on an 8-hour basis, 6,000,000,000 feet; suitable for ship construction, 20 per cent, or 1,200,000,000 feet, or equivalent to 50,000 carloads; estimated amount of lumber per ship, 2,000,000 feet; estimated number of ships which can be built from the product of the mills when running on an 8-hour basis, 600; building ways of wooden shipyards in the Pacific Northwest, 184; capacity, based on three ships per year per way, 554; leaving an over-supply of material sufficient for building 60 vessels; estimated annual production of tonnage from shipways of wood yards in the Pacific Northwest, 3,000,000 tons."

Charles F. Swigert, vice-president of the G. M. Standifer Construction Corporation, was chairman of the session, and others who attended were: Guy M. Standifer, L. B. Menefee, R. V. Jones, W. D. Davidson, Frank Gollan and James F. Clarkson of the G. M. Standifer Construction Corporation; H. E. Pennell, Harry Sherwood and Don Green of the Coast Shipbuilding Company; George C. W. Low, Fred A. Ballin and Judge Arthur Langguth of the Supple-Ballin Shipbuilding Corporation; Fred C. Knapp and James Kerr of the Peninsula Shipbuilding Company; Eric V. Hauser and Superintendent Carlson of the Grant Smith-Porter Ship Company; Judge C. W. Cuthell, general counsel of the Emergency Fleet Corporation; J. W. Miller, secretary to Mr. Schwab; C. H. McCarthy, secretary to Mr. Piez; Robert D. Heintz, chief of the publicity section of the Emergency Fleet Corporation; Doctor Brown, Mr. Schwab's physician; Max H. Houser and E. W. Wright of the McEachern Ship Company; S. M. Mears, Arthur Mears and Dr. E. C. Hedlund of Columbia Engineering Works; Antoine Labbe of the Williamette Iron & Steel Works; J. A. Byerley and A. J. Brix of the Wilson Shipbuilding Company; Captain E. C. Genereaux and H. C. Campbell of the Foundation Company; Judge John H. Stevenson of the Emergency Fleet Corporation; Daniel Kern and Arthur Kern of the Kiernan & Kern Shipbuilding Company; Auditor Fleming and J. Y. Richardson of the Emergency Fleet Corporation; H. L. Corbett, president of the Chamber of Commerce; Frank H. Ransom, H. B. Van Duzer and J. J. Hamilton of the Fir Production Board; William Killingsworth; Manager Feeney of Feeney & Bremer Shipbuilding Company; Manager Sommarstrom of Sommarstrom Shipbuilding Company; H. F. McCormick of the St. Helens Shipbuilding Company; Lloyd J. Wentworth and J. W. Hall of the wooden construction division of the Emergency Fleet Corporation; H. B. Beckitt, E. B. MacNaughton, also a number of foremen from the plants.

Mr. J. H. Cory of the War Trade Board at San Francisco has been appointed chief of the Bureau of Transportation, and will have charge of vessels operating out of San Francisco.

Mr. James C. H. Ferguson has been named as manager of the newly-formed Gaston, Williams & Wigmore Pacific Coast Company, an affiliated corporation with the big New York concern. Mr. Ferguson's headquarters will remain in the Monadnock building, San Francisco.

Pelham Bay Training Station

By Chester W. Lockwood

STANDING out as one of the shining lights of the Navy Department's efficiency as brought out by the recent congressional investigating committee, is the Naval Training Station at Pelham Bay Park, New York City. Ten months ago the site of this remarkable institution was a picnic ground, where the inhabitants of New York were wont to come, to bask 'neath the elms and eat their noonday meal. Where less than a year ago was a green, wooded spot, made boisterous by the ringing of laughter or rollicking children, there are now hundreds of low, racy, gray buildings.

Long, low, racy frame buildings, housing the aristocrat of tomorrow, the volunteer of today. It is to this camp that thousands of young Americans come, who have chosen the Navy as the branch of the service in which to serve their country.

Without a doubt the outstanding feature of this camp is the opportunity offered to every entrant. There are maintained several schools, among them the Quartermaster School, the Radio Operator School, School for Cooks, the Winch School, and the Officer School, also a listening School, a Meteorological School and a Diving School and the Officers' Schools, respectively, the Officer Material School, the Naval Auxiliary Reserve, the Signal Officer School, and the Officer Training School.

The mere mention of these numerous schools will show the reader the remarkable stride taken since the station was officially opened last September. Entering the camp, the prospective sailor is put in the probation camp for twenty-one days. It is there that he receives his vaccination and inoculations and is taught the fundamentals of the naval service. The career of an enlisted man entering the camp might be briefly outlined as follows:

The inoculation period, during which the recruit must pass an examination in the following subjects: Naval regulations, care of clothing, school of the squad and the manual of arms, general orders for sentry, knots, splices and hitches, signals (semaphore and wig-wag), parts and use of a small boat, United States naval ranks and ratings and insignias, log and lead, compass, setting-up drills, and the relative bearing of an object from the ship by points and degrees. Passing an examination in the above-named subjects, the

recruit is sent to the main camp. In this camp he is given a more advanced course of instruction.

Qualifying in the examination given at the end of a month's training, he is given a station rating as petty officer and is assigned to command a squad for a month.

Examination for an entrance into one of the officer training school, follows a successful performance of duty as petty officer. The course in the officers' school is two months in length and the studies of a wide and varied nature. There are over two hundred and fifty graduates of the Officer Training School, which is under the guidance of Lieut. Lincoln De G. Moss, U. S. N. R. F.

The Naval Auxiliary School has a large class every fortnight, who have been fortunate enough to be recommended for commissions.

The man under whose guidance this remarkable institution has been built up is William B. Franklin, commander, N. N. V. Commander Franklin is an Annapolis graduate and has performed an unparalleled feat in bringing the station to its present standard. He has proved himself to be one of the most efficient officers in the service. Not only does he hold the respect of his fellow officers, but the respect of every man in the camp. He is popularly known as the "Skipper," and is described by the enlisted men who are under him or have passed under his command as a white man. Could any tribute be greater? The skipper is a hard worker and is always found at his desk by 7:30, where he remains visibly engrossed in his work until late at night. Commander Franklin has a beautiful home in New York City, less than an hour's ride from the station, but caring little for social life, he occupies a small room just off his office. He possesses all those qualifications that go to make an ideal naval officer, efficient, upright and a gentleman. He remains not only an asset to the station, but is a credit to the same. An efficient executive officer, Lieut. Commander Eckford DeKay has been of valuable assistance to Commander Franklin.

A base hospital, one of the most modern of its kind, is under the direction of Medical Director C. P. Kindleberger. The hospital has space for one hundred beds. There has been very little illness in camp, owing to the continued efforts of Medical Inspector Wright, who, with an excellent staff of surgeons, has been very successful in making the camp, one of the most sanitary of its kind in the world.

The barracks are kept scrupulously clean and the mess halls are models of sanitation. Throughout the Navy the "grub" at Pelham Bay is known to be the very best. Delicacies, cooked to a turn by chefs, who before their entrance into the service were employed by the finest hotels and restaurants in the country. A fully equipped bakery and butcher shop are maintained, while a large modern refrigerator keeps the more perishable foodstuffs fresh. The entire personnel of the camp is served in less than thirty minutes. The Navy Department, realizing the ideal spot for a large naval training camp on the east coast was at Pelham



Instructing sailors at the Pelham Bay Training Station.



Rookies in new isolation camp. The containers shown in the foreground hold rations for twelve men each.

Bay, decided to enlarge the station. The addition is completed and a formal opening of the new camp was reviewed by Secretary Daniels on July 4th.

Despite the increase in cost of materials and labor since the erection of the original camp, the cost per cubic foot of the new work, including everything entering into the construction, such as heating, sewers, roads, water supply, lighting, fire alarm systems, fire engines and a large part of the office equipment is over 10 cents less than the cost per cubic foot of the original camp.

In other words, the new camp had been completed nearly six weeks ahead of schedule and at a cost of considerably over \$1,000,000 less than the appropriation for same. On a cubic foot basis, a saving of approximately \$2,000,000 is shown as against the cost of the original camp on the same basis.

The camp has been built as well, both as to material and workmanship, as is physically possible and will require an absolute minimum of repairs.

The whole credit for this remarkable showing is due to Civil Engineer E. C. Brown and the staff of assistants with which he has surrounded himself.

With a ninety-acre hospital, accommodating one thousand beds, with a large swimming pool, with a capable staff of instructors and the mutual feeling of democracy that exists between officer and man, Pelham Bay Naval Training Station will be more than able to carry her burden in the war and in doing so to raise to still higher levels those cherished ideals of which the Navy is so justly proud.

THE LIFE OF CONCRETE VESSELS

IN discussing the probable life of concrete vessels, the Engineering News-Record of New York for July 11th contains the following interesting editorial:

"The life of a concrete ship depends, more than on any other thing, on something about which we have little knowledge; that is, the ability of the hull to withstand the rack and the wrench of the sea, the terrific strains and twists imposed on a rigid structure under reversal of stresses and suddenly applied loads. Computations of great elaboration based on the best naval architectural knowledge of the day have been made to take care of just these conditions of stress. Scientific foresight has done its best, but so far our sole practical information on the subject is the behavior of the 'Faith' on its exceptionally rough voyage up the Pacific about six weeks ago. Minor defects, due to obviously weak design, appeared, but structurally it survived this most severe test and as a ship it received the commendation of the Lloyds agent who was aboard.

"Possibly one of the new concrete ships will break its back in its first storm. Steel ships have been known to do so. Possibly, but hardly probably, it may make its first port with so many and serious cracks as to incapacitate it for future service. But these things will not mean a life of one to three years; it will be a question of days or weeks. Assuming the ability of the ship to stand up under such conditions, the good concrete we now know how to make should guarantee a ship's life of indefinite length. Early disintegration, the mortal disease of the Atlantic City dispatch, need not be considered.

"Sea water has had a deteriorating effect on certain concretes in the past, but, properly made and

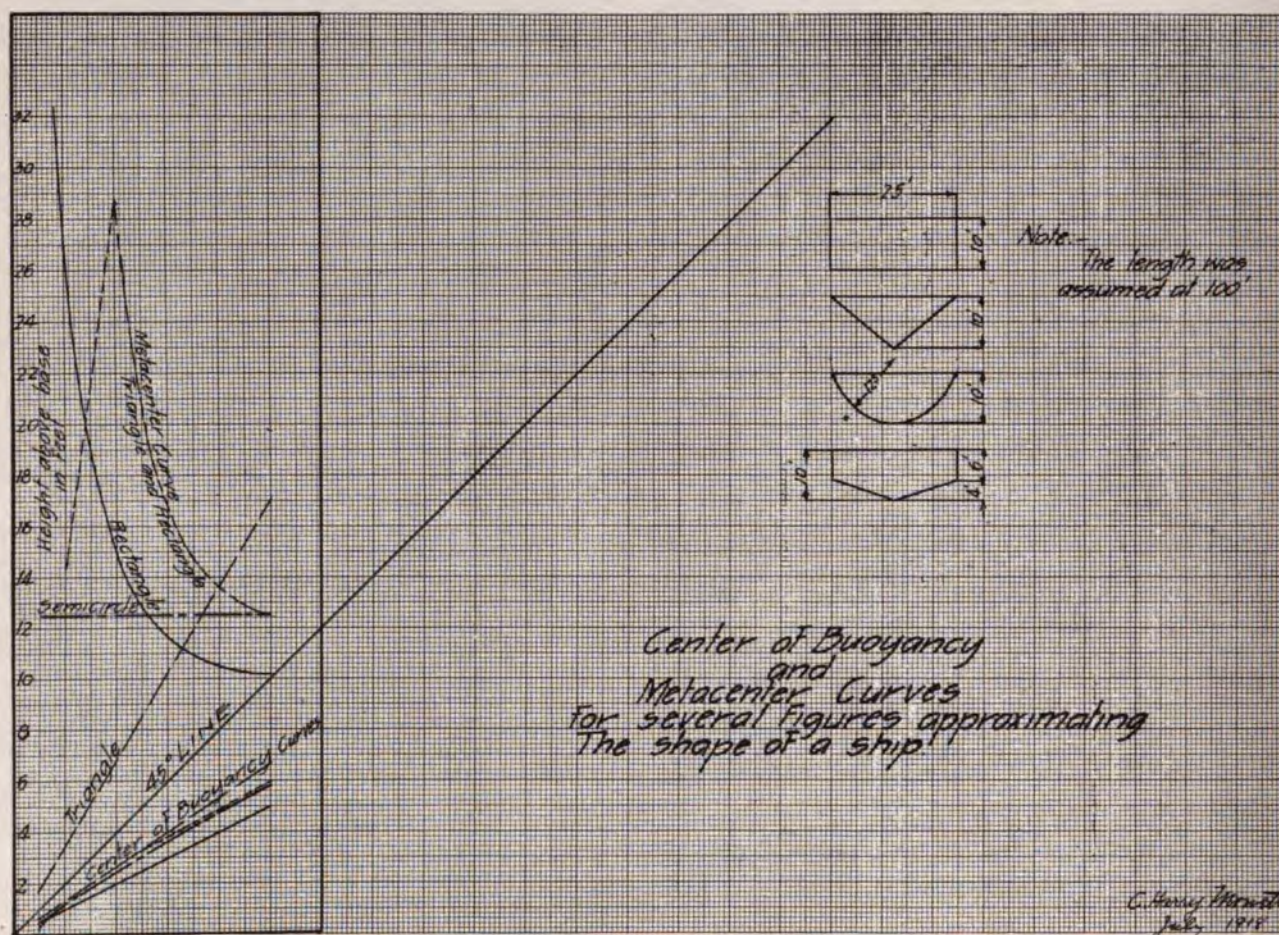


Scene at a recent sham battle. Exercise and study soon create a splendidly balanced set of men.

protected, no such trouble is to be anticipated in ship concrete. Such concrete must be made dense to attain the necessary high strength. It is not subject to abrasions which will expose the steel or the possibly vulnerable sub-surface concrete, except in above-water parts which are readily inspected and repaired, and it will be protected by a surface paint. Furthermore, there will be some of our anti-corrosion coating on the steel. In the light of our present knowledge, these precautions assure its immunity from saline attack, always provided that the concrete is a first-class product.

"Concrete ocean-going ships are radically new,

and all new things in engineering must ultimately stand or fall on their behavior in service. So far as theory goes, it can now be definitely stated that the concrete ship can be designed more accurately than has been the custom with the steel ship. As for practice, in one case at least a concrete ship has been built that can withstand the battering of high seas. While one would be rash indeed to insist on the impossibility of its failure, no one can restrict its possible life to a short and definite term of years and certainly no one can predict its failure from disintegration within a period of economic use.



THE POSITION OF THE METACENTRE AND CENTER OF BUOYANCY OF SIMPLE FLOATING BODIES

By David W. Dickie

The two tables and the chart reproduced herewith illustrate to the practical man what the general effect of the shape of a vessel is upon the position of the center of buoyancy. With a base line plotted at an angle of forty-five degrees, the draft is read along the left hand side of the figure. A level line is run along to meet the forty-five degree line and upon the vertical line passing through their intersection is read the height of the center of buoyancy and the metacenter above the base of the figure.

Mr. C. Harry Monet, one of the students in marine engineering and naval architecture at the University of California, plotted the curves shown herewith, assuming a vessel of 100 feet long, 25

feet beam and 10 feet draft under the following conditions and variations: First, using a rectangular section like a barge, the curve is a full line in each case for the center buoyancy and the metacenter above base. It will be noted that as the draft decreases the metacenter rises, which is due of course to the association of the moment of inertia of the water plane divided by the volume below it with the height of the metacenter above the center of buoyancy. As the volume decreases the metacenter rises on account of the moment of inertia of the water plane remaining the same.

Similarly with the same data for the triangular section, the metacenter falls as the draft decreases. For the circle the metacenter curve is a level line and for the combination of the rectangle and the triangle the metacenter rises as the draft decreases in the region of the rectangular part and then decreases throughout the triangular part below.



Activities Around San Francisco Bay

NEXT month the stockholders of the Gulf Mail Steamship Company will vote upon the question of increasing the capital stock of the concern from \$350,000 to \$750,000.

C. M. Covell, manager of the San Francisco branch of Lunham and Moore, freight brokers, has been in Seattle establishing a branch for his firm in that port.

Charles R. Page, California's member of the Shipping Board, was a visitor to San Francisco during the month, his trip from the East being partially in the nature of business and partially to enjoy a well-earned rest.

The Antoine Chiris Company, a French concern with connections which are world wide and which has been in operation for 150 years, has opened offices in the Fife building, with Mr. R. S. Hoyt in charge. This concern deals in essential oils and operates two fine schooners, the "Tiorgyn" and "Moana" from San Francisco to Tahiti.

Despite the recent heavy demands on bunker coals at San Francisco, the King Coal Company has the situation well in hand, it being this firm's intention to carry a stock of bunker coal of 40,000 tons.

Captain Emery Rice, formerly master of the Pacific Mailer "Mongolia and one of the best known of the Pacific skippers, has been honored with the command of the Leviathan, the largest of all passenger liners.

Mr. Robert S. Hague, superintending engineer of the marine department of the Standard Oil Company, has been impressed into the service of the Shipping Board and will have charge of speeding up steel construction at the Pacific Coast shipyards. Hague has been with the marine department of the Standard Oil for nine years and his appointment is considered an excellent one in shipping and ship-building circles.

The big sailing ship "Katherine", now being altered to a five-masted bald-headed schooner and being powered with two 320 horsepower Bolinder engines, will be fitted with a boiler and heating pipes through her cargo tanks. She will be used in the coconut oil trade and is owned by the Philippine Vegetable Oil Company. Coconut oil solidifies in transit and the usual method of unloading has been to introduce heating pipes from shore and bring the cargo to a consistency where it can be pumped. By having the heating apparatus on board the ship, it is believed large economies can be effected both in the matter of unloading costs and time consumed, as the cargo can be prepared for unloading before the ship docks.

Mr. W. H. Donney, formerly with the Missouri

Pacific Railway's Chicago office, has joined the local staff of the Toyo Kisen Kaisha.

The receiving ship Ocean Wave, Captain J. H. Ansell, has now gone into commission and is handling 250 seamen and engine room students at a time. From this vessel the men are shifted to the training ship under the command of Captain I. N. Hibberd.

George Kneass has laid the keels for two new Peterson launches, which will be 50 by 12 by 6 feet moulded. They will be fitted with 60 horsepower engines.

MR. DE SOUSA GOES EAST

Mr. George S. DeSousa, who has for a number of years been the division superintendent of the Marconi Wireless Telegraph Company of America, has left their San Francisco office and goes to the executive offices of the company in New York. Before leaving San Francisco, Mr. DeSousa had great pleasure in announcing that his company had completed the renewal of their contract with the Pacific Steamship Company for Marconi Wireless Service.

Mr. DeSousa made a host of friends while in



The Woodin and Little "Pump House," 33-41 Fremont street, San Francisco, one of the best known establishments on the Pacific Coast, where the firm has been in operation for thirty-seven years.

San Francisco, who regret very much his going, but he takes with him the best of good wishes.

CONCERN HOLDS UNIQUE POSITION

Service with the highest quality of materials has been the big factor in the success of C. W. Marwedel in the tool, metal and shop supply business in San Francisco. This firm was established in 1872, and their's has been a study devoted to the special requirements of the purchaser of mechanical goods. A complete stock of supplies for the worker in metals, also a varied stock of brass, copper, bronze, aluminum, nickel silver in sheets, rods and tubes, is carried.

It is difficult to realize the extent of items and variety of stock carried by C. W. Marwedel. Their complete catalog shows special items which present great difficulty to the purchasing agent when it is necessary to obtain same. Special fittings, gears, rivets, burrs, tools, bearings, abrasive materials, welding materials, machine and cap screws, and a tremendous line of experimenter's materials are carried.

"If you can't get it at Marwedel's, give it up," has become proverbial to purchasing agents in the San Francisco metal and tool market.

ANOTHER RAISED DECK SCHOONER

Captain Alexander Woodside has awarded a contract to Barney Lanteri of Pittsburgh, Cal., to put a raised deck on the schooner "Esther Buhme" similar to the one installed on the "Bertie Minor" some months ago, to enable her to carry case oil to Australia and return with copra.

Captain Woodside originally intended to install a raised deck on the schooner "Ottillie Fjord," but

he afterwards concluded to use this vessel in the fishing trade, and transferred his contract to the schooner "Esther Buhme," which is expected here in September.

Plans for this work were made by D. W. & R. Z. Dickie last December, and Lanteri was awarded the contract in February, and it will be remembered that on the "Bertie Minor" the work was completed in fifteen days, which was five days ahead of the contract time.

The schooner will be taken to Pittsburgh as soon as her cargo is discharged and the work will be done up the river, where the labor conditions are more stable.

SHIPBUILDING ACTIVITIES

One of the visitors to San Francisco during the past month was Mr. J. R. Wig of the concrete section of the Emergency Fleet Corporation's personnel. Mr. Wig stated that there were forty-two concrete vessels on the Government's shipbuilding program and that eight 7,500 ton deadweight carriers would be built at the Government's new concrete shipyard at Alameda.

The first meeting of the full committee appointed by Charles Piez to work out shipyard labor classifications for the Pacific Coast yards and recommend wage scales has just been held here. The committee consists of George Armes, president of the Moore Dry Dock and Shipbuilding Company of Oakland; H. J. Anderson of San Francisco; J. F. Duthie, president of J. F. Duthie & Co., Seattle, and David Rodgers, general manager of Skinner & Eddy, Seattle.

On a recent visit to San Francisco Mr. Walter A. Gompertz, general manager of the Chikloon Coal Company made the following statement regarding the progress of that concern in the Alaskan coal fields: The work of the Chikloon Coal Company, of which M. J. Fontana of the California Packing Company is president, is in the development stage at present. The coal deposits are owned by the United States and our company has leased a certain area from the Government. We will have coal mined and ready to ship by next spring. We will then be in a position to supply the entire west coast ports of North and South America and Hawaii, and the work of constructing bunkers at the principal ports will be under way. The coal is an excellent smokeless coal, which is usable for steam and bunkering, but not for home supply.

Ship production in the United States in June amounted to 280,400 deadweight tons, making the total production to date 1,084,670 tons.

The June production, which is at the rate of 3,364,800 tons a year, is a new record for the United States, and is the greatest output of ocean-going tonnage ever completed in any one month by any nation. It comes within 15,000 tons of the world's record for shipbuilding made by the British yards in May, but which included all classes of vessels.

In the first week six ships of 24,430 deadweight tons were delivered, the second week ten more of 64,732 tons were added, and in the third week the average for the month was made one a day by the completion of five ships totaling 61,260 tons. It was in the last week of the month, however, that the builders really hit their stride and gave evi-



The concrete ship "Faith" at sea in heavy weather. She gave an excellent account of herself.



The "Faith's" first trip northward from San Francisco furnished a thorough test of her sea-going qualities.

dence of the tremendous output which may be expected. Deliveries in the last week totaled 129,978 tons, which is at the rate of nearly 7,000,000 tons a year.

SOME OAKLAND HAPPENINGS

ACTUAL work has been started on the Rolph shipyard at the foot of Willow street, Alameda, and the hulls of the two big ocean-going tugs, which will be built there, will soon begin to take shape. Captain Clem Randall is in charge at the plant.

Mr. C. H. Fischer, president of the Union Gas Engine Company, has been honored with re-election to the presidency of the National Gas Engine Association. This is a splendid tribute to the integrity and popularity of the president of the big Oakland gas engine building plant.

An innovation in shipyard work is being prepared for the Pacific Coast Shipbuilding Company's plan by R. L. Silvey, foreman of the burners and welders. He is going to conduct a school of instruction among the men in his department during the noon hour.

This scheme, it is believed, will set a worth while example in the continued building up of America's great war-time industry. Men with an aptitude for this phase of skilled shipyard work will find in the class an opportunity to test their capabilities, and those with small experience will be shown the fine points of burning and welding by a man who is rated as one of the best workmen in that field in the country.

Such a school at the lunch hour has not been established under similar conditions in other yards, it is declared.

Much interest is being shown in the plans for the experiment among the employees of the plant, who now number more than a thousand.

Silvey had a reputation before he went to the Suisun Bay yard, where the fourth keel was recently laid, six months to a day, from the time ground was broken for the construction of the plant. Not long ago he engaged in a contest of skill with Charles Molas, who is recognized as one of the most qualified cutters of France. Silvey cut 266 inches of 7-16 steel in 12 minutes and 14

seconds, while Molas cut 242 inches in 22 minutes and 45 seconds. On a second test Silvey cut a piece of steel 7 inches thick and 12 inches long in 5 minutes and 10 seconds, using Molas' tools, which he had never seen before. In this test he beat Molas by 15 seconds. During the test the hose used by Silvey was broken.

That the two-day strike of boilermakers at the East Bay shipyards will have little effect on the output of the three establishments affected, is the opinion of the shipbuilders. At the Moore yard, while no attempt is being made to make a special record, efforts are bent to turn out a vessel every alternate week, and the interruption of two days is expected to be made up. It is expected that the two days lost in the strike will not be counted in figuring the time on the building of the "Challenger" at the Alameda plant of the Bethlehem Steel Company. The aim is to complete this boat, the keel of which was laid July 4, in twenty-eight days.

FAR EASTERN TRADE DIVISION

The Bureau of Foreign Commerce at Washington has announced the creation of a Far Eastern Division with C. M. Bishop of New York at its head. The new division has been formed in official recognition of the closer relations between America and the Oriental nations and the first governmental step towards promoting commercial intercourse with them on a large scale.



The San Francisco home of the C. W. Marwedel Company, this firm has occupied an unique position in the western machinery and metal markets for over forty-five years.

In Coast Transportation Circles

TRANSPORTATION by water is receiving an impetus from this world war that will carry it through generations as one of the most important fields of human endeavor," said A. F. Haines, general manager of the Pacific Steamship Company, in a paper which was read at the recent international convention of the Rotary Clubs in Kansas City, Mo.

Mr. Haines was chairman of the water transportation section of the convention, but was prevented from presiding by pressing business affairs, and the address which he had prepared was read by the vice-chairman. His address in part follows:

"We are engaged in the most important vocation in the world today. Transportation has always been one of the three primary factors in the scheme of human existence—first, agriculture; second, transportation; third, manufacturing.

"Today the world is engaged, first in war, second in transportation, third in manufacturing. To win the war there must be transportation of men to the battle fronts and transportation of the wounded to the rear; transportation of materials to the factories and the munitions and supplies to maintain our armies.

"This necessary transportation is not, however, confined to the troop trains to the front, nor to the steamers that carry the men across the seas, nor to the bridge of vessels that supplies them. It reaches the furthestmost corners of the earth. It includes transportation of timber from the forests, of rubber from the plantations, and of cotton to the gins and of the grain from the fields. Even the youngest junk on the Yangste Kiang and the crudest lighter on the Mississippi River are units in the great problem of transportation today.

"Transportation by water is receiving an impetus from this world war that will carry it through generations as one of the most important fields of human endeavor. We shall use the seas and waterways of the world as never before.

"It is a far cry from the log raft propelled by a stick to the modern ocean steamer, but our present-day methods of water transportation will cause our grandchildren to pity our benighted ignorance.

Look backward at the improvement and changes in the last generation and marvel at nothing the future may bring. We are passing through a wonderful process of evolution. Many of the principles of the government and the principles of international life are undergoing great changes. What the outcome will be is but dimly outlined in the misty future. It is certain, however, that we are advancing, that our present sacrifices are not in vain. Our profits will be commensurate with our service.

"This convention should give us inspiration. Let us therefore counsel together and devise ways and means that we may improve the relation of our vocation in the winning of the war and the eventual establishment of a peaceful world with a Council of Nations."

H. F. Alexander, president of the Pacific Steamship Company, was host at a luncheon at the Rainier Club in Seattle recently in honor of J. H. Rosseter, newly appointed director general of the division of operations of the U. S. Shipping Board. Mr. Rosseter was in Seattle on a tour of the Pacific Coast before assuming his duties in Washington, D. C.

The luncheon was attended by all the prominent shipping men of the Puget Sound district, places being laid for sixty-five guests. In addition to Mr. Rosseter, Mr. Alexander called on Captain Robert Dollar, A. J. Rhodes, president of the Seattle Chamber of Commerce, and Captain J. F. Blain, Northwestern head of the steel construction department of the Shipping Board, to address the gathering.

All the speakers, including Mr. Rosseter, laid emphasis upon the necessity of planning for the future needs of the nation as well as for the immediate war needs. Mr. Rosseter pointed out that the one is a necessary part of the other. Mr. Rosseter declared that to win the war was the controlling motive at this time, but that neither now nor after the war could the nation get the full benefit of its efforts if its products were not carried in American vessels and if their operation was not placed on par with the efficient methods of other maritime nations.

Captain Dollar stated that American vessels could not operate in successful competition with Japanese and other foreign nations after the war if such vessels were to be handicapped by laws which placed them at an insurmountable disadvantage. He expressed his belief, however, that the people of the United States were awakening to the necessity of maintaining a large merchant marine for its economic development and as a means of national defense.



The freighter "Major Wheeler" taking the water at the Oakland plant of the Hanlon Dry Dock and Shipbuilding Company on San Francisco Bay's great launching day, July Fourth.
International Film Service Photo.

A. F. Haines, general manager of the Pacific Steamship Company, returned to Seattle recently after spending over two months in the East conferring with Government officials and looking after the business interests of his organization.

Mr. Haines divided his time between Washington, D. C., and New York. He found all industries on the Atlantic seaboard keyed up to a high pitch, but he declared that the activities of the West in industrial war work compared most favorably with the most efficiently handled undertakings in the East.



The four big freighters Victorious, Challenger, Defiance and Independence ready for launching at the Alameda Works, Union Plant of the Bethlehem Shipbuilding Corporation on July Fourth. This set of ships constitutes the greatest tonnage yet launched in a single day from any American yard.

International Film Service Photo.

After attending a meeting of U. S. Sea Service Bureau representatives in Boston, E. J. Griffith, head of the bureau in the Northwest, returned to Seattle with the announcement that the increasing need of seamen to man new vessels would result in the expansion of the work being performed by his office within a short time. While East he spent a few days in New York and Washington, D. C., where he conferred with other Shipping Board officials.

Of unusual interest in shipping circles was the recent announcement by President H. F. Alexander of the purchase of two auxiliary powered wooden schooners for use in trans-Pacific trade. The vessels were purchased before completion from their builders, the Puget Sound Bridge and Dredging Company of Seattle.

Mr. Alexander named them in honor of two distinguished naval officers, Admiral Sims and Admiral Mayo. Each has a deadweight carrying capacity of 3000 tons. The Admiral Mayo was still on the ways when the sale was made, and at her launching on July 5 prominent officials of the Admiral Line were in attendance. The schooner was christened by Miss Ruth Haines, the 13-year-old daughter of General Manager A. F. Haines of the Pacific Steamship Company.

Mr. Haines stated that the vessels were purchased primarily to help bring to the United States the products of the Orient that are necessary to the nation's war requirements, such as rubber and food products. He pointed out that if the full benefit in the exchange of products with the Orient are to accrue to the United States, as much tonnage as possible must be carried in American bottoms.

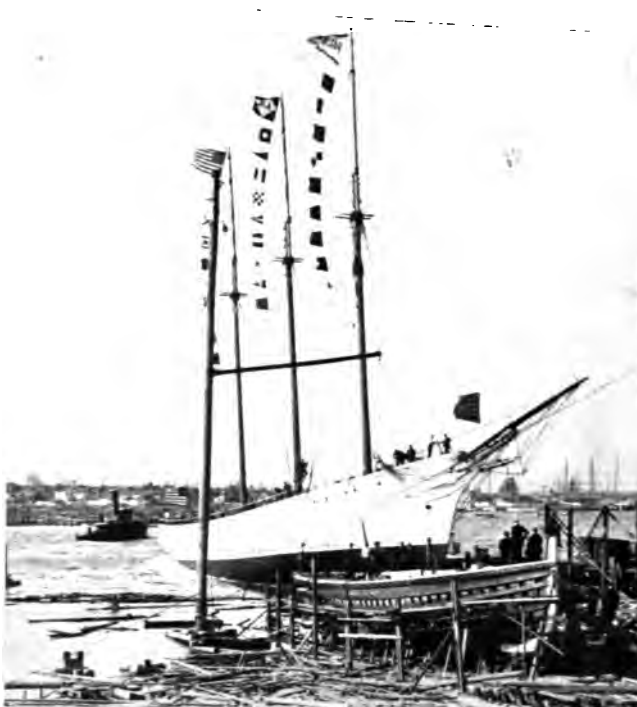
Shortly after the purchase of the Admiral Sims and Admiral Mayo, the Pacific Steamship Company announced that it had chartered the newly built wooden steamship Lovejoy for a period of three months for use in the Seattle-Southeastern Alaska trade. Mr. Haines stated that this action was in line with the company's determination to provide adequate tonnage for the Alaska trade despite the high charter rates and the demand for vessels elsewhere.

The Lovejoy was built by the Ballard Shipbuilding Company of Seattle. Her launching was unique

in that she was 100 per cent complete and had steam up when she slid down the ways. She has a deadweight carrying capacity of 2000 tons. She sailed on her first northern trip the latter part of July.

The Admiral Sims, which was launched on May 25, was delivered to the Pacific Steamship Company in July and sailed on her first trip to the Orient a few days ago. The launching of the Admiral Mayo was attended by President H. F. Alexander, General Manager A. F. Haines, E. A. Stuart, M. A. Arnold, William Jones, directors, and W. C. Morrow, general counsel.

A. O. Anderson & Company have moved into new quarters at 242 California street, the move being necessitated by the need of more room to take care of the rapidly developing business.



The Oakland-built South Sea traders are as graceful as a sailing yacht.

Far Eastern Conditions

By Thomas Fox, F. R. S., Singapore

IN the markets here there are signs that American manufacturers and exporters are awakening to a realization of the possibilities that lie within their grasp. In the Straits and the Dutch East Indies one comes across the American merchant, and the representatives of the American manufacturers far more frequently than was the case even as recently as a year ago. Before the war the position of America was not a strong one here, and, what is surprising, it was some time after the commencement of the war that American exporters displayed any real interest in conditions. It may be an exaggeration to state that if it had not been for the importers at this side clamoring in the American markets the American exporter would not have taken the trouble to find out what was happening in the East Indies, but it is only stating facts to put it that it was the insistent demands of the people here for goods that they could no longer secure from Europe that made the American appreciate the situation. I am speaking in general terms. It may be that even before the war there were a few exporters at your side who in a way realized the possibilities of Eastern markets lying beyond China and Japan, but in general these markets were a closed book.

Even now, are the Americans doing all they might do? I do not think that they are. Some of the larger firms are appointing representatives to solely represent them. They are sending men from their own staffs, men who understand their conditions of trade, who have been made conversant with not only the particular lines handled by their firm, but the particular way in which this firm does business. This has an advantage, but at the same time a disadvantage, as all systems must have. It has the advantage that the representative sent over knows what his firm can supply, he knows how they will execute any particular order, and he knows, as a consequence, just how far he can go in taking orders and pushing goods. Further, he realizes how far he can go in making suggestions which he thinks might lead to improved trade through an attempt to meet the conditions at this side. But he can only have a very limited knowledge of the market here, of the language, of the people. Conditions are entirely different to those existing at your side, and your methods will not work here without considerable modification. So if your man comes over saturated with your traditions (which for your domestic trade are excellent), if he attempts to work on lines he would follow in America, he will soon find that he is up against a proposition that bristles with difficulties. He will upset the Chinese, the Arab and the Indian traders—and they are in the majority. The European houses may understand him, though even these are a little parochial through their association with Eastern races. Your representative will find that our Chinaman is cautious to the degree of irritation. He will find that the Arab and the Indian are suspicious, and this may hurt the dignity of your representative. The suspicion will be shown in many peculiar ways. What has to be remembered is that the Western and the Eastern mind are moulded on different lines, and when he shows his suspicion the Arab or the Indian does

not mean to insult either your representative or your firm. He is suspicious in self-defense. He throws out his suspicion just as the porcupine throws out its bristles, as a safeguard.

Your representative will be faced with delays, procrastination, suspicion, and a bland exterior, which will upset him unless he tries to throw aside some of his Western business ideals. It is a difficult situation, and can only be handled by the most tactful. Bluff and bluster will not act. It merely means that you shut yourself out of the market.

Now, on the other hand, if the exporter places his goods with a firm here, he has the assurance of being represented by people who understand the market. They know how to deal with the Oriental races. They know what every move means. But they may not know the American market. It is possible that they may not be conversant with the particular lines of goods in which you deal, and that is a disadvantage.

The question, then, is whether it is better to send a man from America who not only knows American conditions, but knows our conditions, or to be represented by a firm here that knows the conditions of marketing but does not know the American conditions. That is a question for individual firms to decide. What strikes me as probably being the best arrangement if one wishes to spare expense is to place the lines with someone who knows conditions both here and in America. But it is difficult to secure such a representative. It is simpler for the British firms to secure such a person because the majority of the men in business at this side have had business experience in Britain.

But the Americans will be missing their opportunities if they refuse to consider the markets here simply because there are difficulties in the way of proper representation. On the one side, your man direct from the American house in time will become conversant with conditions here. He will pick up the language and he will learn the prejudices and inclinations of the Eastern races. On the other hand, the man at this side will soon make himself conversant with American conditions, and if he is supplied with ample literature and full instructions cannot go far wrong. The man at this side, too, will prove the less expensive at the start. The volume of business can later decide whether it is worth while opening a direct office here.

Sudden & Christenson are expected to enter the offshore trades as operating agents for several of the Shipping Board vessels in the near future. This will be the second venture of this company on long voyage business on a large scale, they having formerly operated vessels on the Coast to Coast run for some time.

The War Trade Board have placed cocoanut meat upon the list of restricted imports. All outstanding licenses for the importation of cocoanut meat in any form have, by a new ruling (W. T. B. R. 148), been revoked as to ocean shipment after June 30, 1918.



On and About Puget Sound

THE Puget Sound Navy Yard at Bremerton has received orders from the Government for two ammunition ships and 7 mine sweepers.

For the first six months of 1918 the records show that 669,000 tons of freight pass through Seattle's public terminals. This is a gain of 38 per cent over the first six months of 1917.

Captain J. G. Ludlow, formerly port captain of the Pacific Steamship Company in Seattle, has been given a lieutenant commander's commission in the United States Naval Reserve.

Mr. J. Ray Moore has been appointed chief wharfinger of the Pacific Steamship Company at Seattle to succeed James S. Grant, who has become superintendent of the East Waterway Dock and Warehouse Company's Oriental oil terminals on Harbor Island.

Captain Makita, manager of the foreign trade department of the Ocean Transport Company, Ltd., was a recent visitor to Seattle and had the following to say about his company's plans: "Among the services planned are lines to the east and west coasts of South America, to New York, to Galveston, New Orleans and the West Indies. We are building 60,000 tons of shipping in Japan and now

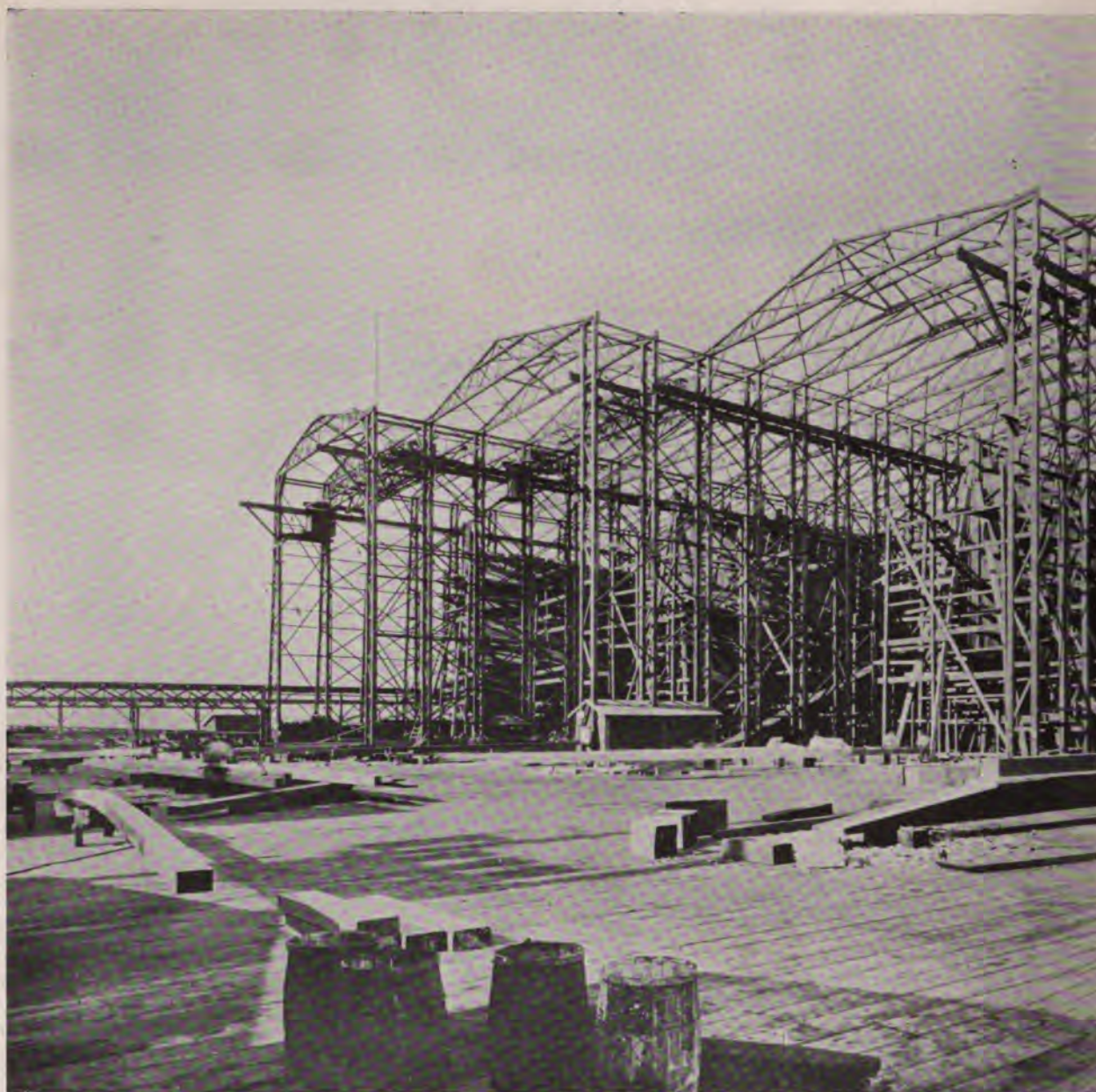
have 30,000 tons under charter. My mission on the Pacific Coast and my tour of the world has for its object the consideration of trade routes for the new vessels and those we have under charter. Our company is now operating vessels of large size between the Orient and Seattle, the Orient and San Francisco, to Australia, the Dutch East Indies and the Straits Settlements. I expect to make a general study of trade conditions, and after spending considerable time on the Pacific Coast will go to Chicago, New York, the Gulf ports and the east coast of South America. We now have more than thirty vessels in the trans-Pacific trade, but expect to make still further increases in the service. Larger carriers will be placed on the Seattle-Oriental route, which is now the most important served by our company."

At a recent meeting of the Port Commission, Chief Engineer Nicholson was instructed to prepare tentative plans for the duplication of the Smith's Cove terminal.

The proposed extension of the existing pier, one of the largest in the United States, would give it a total length of 2,600 feet. The plans provide for extensive dredging on the inner section. At pres-



Scene at the large and interesting plant of the International Spar Company, Seattle.



View in the plant of the Elliott Bay Shipbuilding Company, Seattle, showing the six building berths fitted with overhead cranes

ent this pier has berthing space for several ocean freighters. The extension would give space for eleven of those ships. The dirt removed by dredging would be used by the city in filling in Railroad avenue and Elliott avenue in their northern sections. A resolution providing for such an agreement is to be introduced in the City Council next week. The city and the port, under the tentative plans, will split the expense of dredging. About 1,000,000 yards of dirt would be removed.

The duplicate of the Smith Cove pier is to be 2,700 feet long. On the land end two 1,000-foot transit sheds, each of two stories, will be built if the commission decides to go ahead with the improvement. As business demands, the sheds could be extended seaward along the open wharf. The proposed duplicate will have berthing space for fourteen ocean carriers. The commission in September will ask the voters to authorize a bond issue of more than \$2,000,000 for the proposed improvement. Originally the commission planned to duplicate the Smith Cove pier and to build another great terminal in the East Waterway. The instruc-

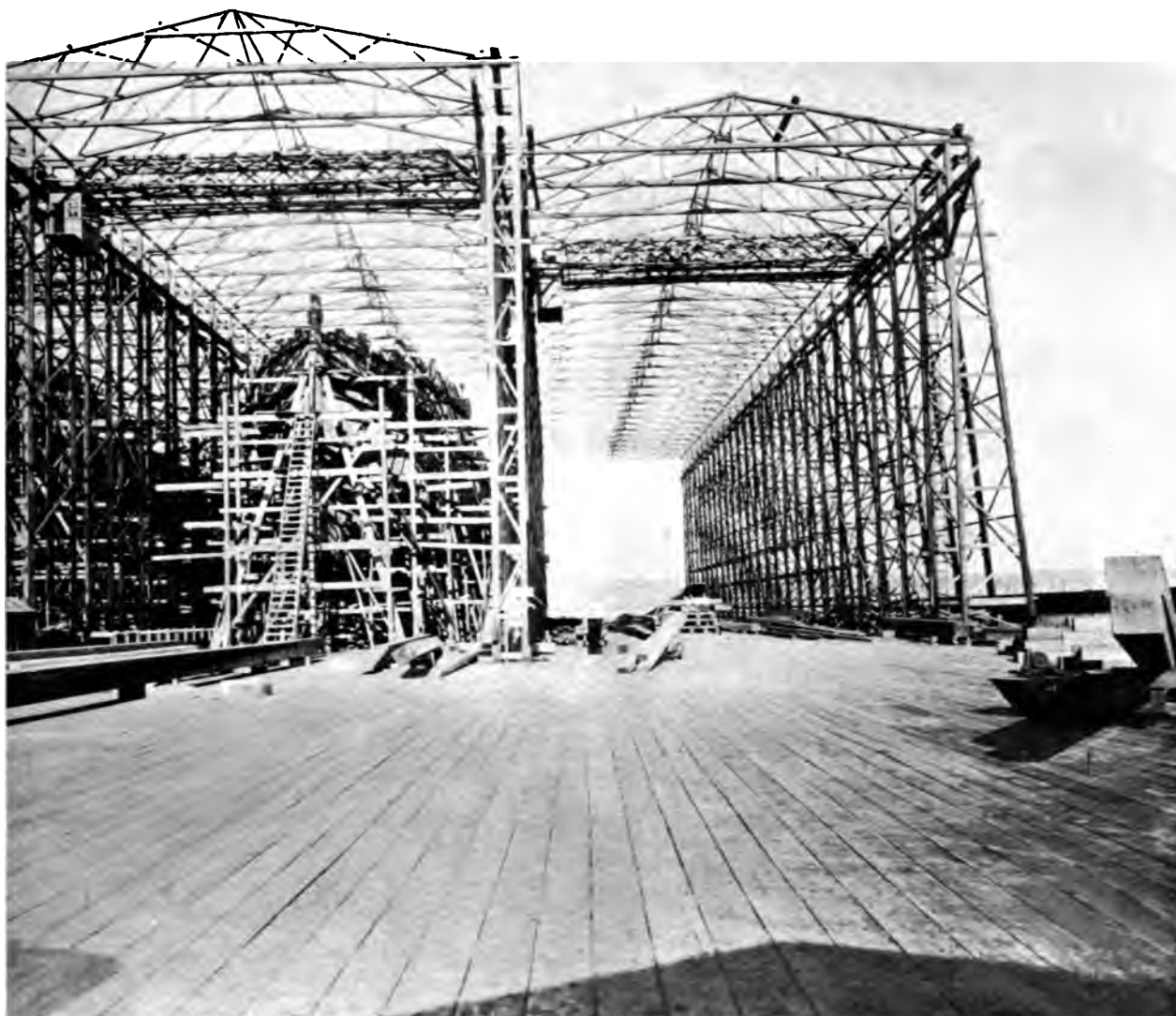
tions to Nicholson recently indicate that the commission will drop the East Waterway proposition and concentrate on a vast terminal system in Smith Cove.

C. K. Magill, formerly connected with the American-Hawaiian Steamship Company and with Williams-Diamond Company, has been appointed a captain in the corps of army engineers, having in charge the transportation of the National Army.

The Northwest Motor Company, a concern of which A. P. Nute is president, has decided to erect a plant for producing heavy iron and steel castings for ship work. Three acres have been secured on the Duwamish Waterway and an original expenditure of \$150,000 is planned.

H. A. Kimball, for seven years assistant general freight agent of the Great Northern Railway, with headquarters at Seattle, has joined forces with Mitsui & Company and will have charge of their rail traffic. Kimball went with the big Japanese firm on the first of July.

The 3500-ton deadweight motorship Cethana, built by the Sloan plant at Olympia, and powered



A glance at these pictures will serve to show the care taken to secure the most advantageous working conditions such as is shown by the complete decking of the yard, etc.

with twin 500 horsepower McIntosh and Seymour Diesel engines, has under gone successful trials and has started on her maiden voyage.

At the close of June the Seattle Port Commission adopted several raises in the port's rates to meet the added cost of transacting business. Wharfage on ocean cargo remains at 35 cents per ton, handling rates on ocean cargo were increased from \$1.20 to \$1.50 per ton, or including wharfage from \$1.55 to \$1.85 per ton. Handling charges on coastwise freight have been raised from 35 to 45 cents per ton, local wharfage from 20 and 25 to 30 cents per ton, and ice from \$2.50 and \$3.00 per ton to \$3.00 and \$3.50 per ton.

The Seattle Pipe and Galvanizing Company is erecting a galvanizing plant at First Avenue South and Stacy street, where marine work will be specialized in. Mr. M. M. McElwaine, for five years manager of Crane Company at Seattle, will be in charge of the plant.

Mr. John Wilson, one of the organizers of the Ames Shipbuilding and Dry Dock Company, resigned recently as general superintendent of that

concern's big Seattle plant. Mr. Wilson is head of the Wilson Shipbuilding Company, which has three ways for wooden vessels and is at present devoting all his attention to the affairs of the wooden yard.

Contracts to build four topsail schooners of 2,200 tons deadweight capacity each have just been awarded by private parties to the South Bend Shipbuilding Company, a new concern which has just completed a shipbuilding plant at South Bend, Washington.

Mr. W. H. Pierson, a brother of R. E. Pierson, superintendent of the Alaska Steamship Company, has just been appointed port engineer for W. R. Grace and Company, with headquarters at Seattle.

The shipment of 100,000 tons of steel plates and shapes to the Orient in lieu of the turning over of tonnage by Japan to the United States, will add considerably to the present burden on Seattle's port facilities, and exporters who are clamoring for licenses may find some difficulty in getting bottoms for the Orient.



The unique and eloquent greeting prepared for Mr. Charles Schwab by the employees of the Todd Dry Dock and Shipbuilding Co., Tacoma.

The Past Month in Tacoma

TACOMA'S offering to the Allies and the United States in the shipyard splash of July Fourth amounted to five vessels, one steel ship, one auxiliary schooner and three of the Ferris type vessels, or a total of 21,000 tons. This made the Tacoma list since the first vessel was launched here for the Emergency Shipping Board, 22 ships or 82,500 tons.

The Tacoma builders started the celebration on high water just after midnight of July Fourth when at the Seaborn Shipbuilding Company plant the "Chino," sponsored by Miss Josephine Fransioli of Seattle, went into the water. A few minutes later the "Bourneville," at the Wright shipyard, was launched and christened by Miss Miriam Wright, daughter of President George P. Wright of this company.

The other launches occurred almost simultaneously, all being set for 4:00 o'clock on the afternoon of the Fourth. The Tacoma shipyards as their offering sent the "Coloma" overboard, sponsored by Miss Murial Prichard, with the Foundation Company No. 4 sending the "Dunkerque" into the water with Mrs. Dean B. Johnson doing the honors for this ship. At the Todd yards the launching was in the hands of the men who chose for their sponsor Miss Margaret Allison, sixteen-year-old daughter of F. G. Allison, apprentice fitter. This vessel put out here was one of the standard 7,500 tons type and named "Anacortes." After the launch Miss Allison was presented with a \$500 Liberty Bond by the yard through General Manager A. J. Eves of the plant.

Capt. W. Frank Andrews, one of the best-known shipping men on the sound through his connections with the International Stevedoring Company, of which he is vice-president, was recently given his commission as lieutenant commander in the Navy and placed in charge of the "West Cohas." Captain Andrews took up seafaring life when fifteen years of age and at twenty-four was in command of the brigantine "Pronto," sailing out of Yarmouth, N. S. For sixteen years he was in the bark "Glenalvon." He has made his home in Tacoma for a number of years and is a member of the Rotary and Commercial Clubs. For five years he was commander of the State Naval militia.

It was expected that the "Quinault" built by the Seaborn Shipbuilding Company would be formally taken over by the Government or the Matson Navigation Company, to whom this vessel has been awarded for operation on July 6. The "Quinault" made a speed of a little better than eleven knots on her trial runs. She will go out in command of Captain Covell and Chief Engineer John Hulen.

Eugene Stewart, who has operated a towing and livery business at Tacoma for a number of years, has gone with the Foss Launch Company as port engineer for their steam tugs and combined their launch interests. Mr. Stewart is one of the old-time steamboat men out of Tacoma.

According to United States Tea Examiner Leonard G. Fenton of the Puget Sound district, with headquarters in Tacoma, this district will lead the United States for the fiscal year in the amount of tea imported. Tacoma's imports amounted to 45,576,000 pounds, with New York and San Francisco several million pounds less.

In the case of G. Noots, who brought suit in the Federal Court here to recover damages amounting to some \$65,000 against the Grays Harbor Shipbuilding Company, Andrew Peterson and the Massachusetts Fire & Marine Insurance Company, the jury held against the plaintiff, but who has announced that he will appeal and has until August 2 to file exceptions. According to Mr. Noots, a native of Holland and owner of the motor ship "Suzzane," this vessel stuck on the ways in launching and was badly hogged. This and the delay to the ship caused the action to be brought.

The freight steamer "T. W. Lake," which has recently been fitted with heavy oil motors, is declared by her owners, the Merchants' Transportation Company, to be making much better time and handling larger amounts of freight at a more economical rate than with the old steam power. This vessel is one of the interesting ones of the sound. It is declared that upon this vessel Joshua Green, president of the Puget Sound Navigation Company, laid the foundation for his fortune.

There has been little lumber movement out of here during the past month and not many inquiries with chance of business, exporters declare. There has been a little business with the West Coast and would be more, it is stated, if tonnage could be secured.

On account of the great amount of improvements being made at the Todd Drydock & Construction Corporation plant the visitor of two months ago would hardly recognize the big plant. At present new machine shops are going up; a 300-unit hotel building is being constructed; additions to the steel sheds are under way and new building berths and launching ways constructed. The plant is now employing close to 5,000 men.

The first steamer to come here with oil for the North Sea Products Company was the "Gray," operated by the Victoria end of the company, which brought down about 22,000 drums. There was also some bone in the shipment. The North Sea Products Company is now having its oil tanks completed here and rapidly arranging to carry on an extensive trade. At present the firm has large orders for whale meat from Boston and for the canned product. There will be several steamers call here during the season with the company's product.

In connection with the northern fishing it is not expected that the "Glory of the Seas," operated and owned by the Glacier Fish Company of Ta-

coma, will be taken north this season as a cold storage ship. War conditions and possible need for the vessel are holding the ship here, it is stated.

Box shook shipments to the Hawaiian Islands will run fairly heavy during July, according to present indications. There will at least be two cargoes of 4,000 tons each, which it is believed will be of material benefit to the pineapple industry. Tonnage was promised nearly two months ago to move this freight, but the vessels were delayed in getting here.

While not definitely settled yet, it has been expected that additional contracts would be awarded the Foundation Company for the construction of other vessels at the yards here. The Foundation yard No. 4 is planning to put a ship each week in the water and to have trial runs in practically the same rate. In the "Gerbeviller," put out here, the machinery was installed within a month. This is believed to be a record for auxiliary vessels. The work is in charge of George Kingsbury.

Edward W. Heath, who has been with the Tacoma Shipbuilding Company since its inception as superintendent, has resigned and it is understood will take a position carrying greater responsibility. Mr. Heath is one of the best wood ship builders on the Pacific Coast. Among his vessels is the "Jefferson," now in the Alaska service, and the dredge "Pacific."

European Marine Notes

Exclusive Correspondence of "Pacific Marine Review"

The White Star Deal

NEGOTIATIONS have been concluded by a British syndicate, with which it is understood Lord Pirrie and Sir Owen Philipps are associated, for the purchase of the British interests in the International Mercantile Marine Company, but the transaction has still to be ratified by stockholders. The reported transfer price of \$125,000,000 is much below the present market value of the ships, which aggregates about 960,000 tons, the concerns included in the agreement being the Oceanic Steam Navigation Company (White Star Line), the Atlantic Transport Company, the British & North Atlantic Steam Navigation Company (Dominion Line), and most of the capital in Frederick Leyland & Co. By an understanding arrived at between the Admiralty, the Board of Trade and the late Pierpont Morgan in August, 1903, when the famous combine was formed, none of the vessels could be transferred to foreign registry for twenty years from that date, and I believe that as the result of a recent arrangement it was decided that the restriction should be operative for three years after the end of the war.

Ships Growing Cheaper

Those Norwegian firms who last year placed orders with Northeast coast shipbuilders for, it is estimated, about 700,000 tons of shipping at the high price of \$135 a ton, have, I hear, been endeavoring to sub-let their contracts. Some have managed to get out of the business at a profit, but, on the whole, their efforts have not been success-

ful. A few months ago also certain French ship-owners signed agreements in the United States for the construction of a number of vessels at \$225 a ton, for delivery after the war, and, judging by present appearances, their position is serious. They paid one-sixth of the contract price as deposit. The inner meaning of these transactions is that the shipping world now holds that the Anglo-American national shipbuilding programs are bound to overtake destruction by submarines, and to leave the world at the end of the war with shipping enough for its needs.

Warships as Merchantmen

The proposal to transform, after the cessation of hostilities, some of the surplus war vessels into cargo carriers has caused much discussion in shipping quarters, but the possibilities of the idea can only be realized by the careful consideration of the actual facts. Naval architects and shipbuilders generally are not opposed to the idea, though they admit that the cost of the alteration will be great, but not so heavy as that of building new ships. It is likely, however, that the scheme will be submitted to a committee representative of the Admiralty, the Naval Construction Corps, the Board of Trade, the Institution of Naval Architects, the Chamber of Shipping and Lloyd's Register. Some years ago the Navy Department at Washington considered the question, I believe, when merchant tonnage was short, and actually took some action in the matter. It is said that the former Spanish gunboat *Nueva España*, which was built at Cadiz nearly thirty years ago, is about

to begin a new career as a cargo boat, and also that the government of Argentina has decided to convert several obsolete warships into traders.

Suggested State Auction of Ships

It will be found that strong support exists in the shipping industry for the suggestion made in the London "Times" that the large number of ships purchased by the State should now be sold at public auction and the State recouped for a part of its enormous outlay in tonnage. There is general recognition of the truth that responsibility for a large program of mercantile construction can only rest with the State. The competing demands of the Navy and the Merchant Marine for men and material in the shipyards are such that the allocations must be agreed upon by central authorities. The Government is in a more favorable position than private owners for arranging terms with builders in the British Isles, and it is certain that only the Government could have afforded the very high prices paid for some of the vessels built abroad. But when the vessels are ready for service the advantage of individual management, even in time of war, is recognized, and experienced steamship managers are appointed, at nominal fees, to act as "ships' husbands."

There need be no possibility of any question of large profits accruing to owners, if the vessels are now sold to the State. There were those who in the earlier months of the war proposed that their ships should be requisitioned by the State on the basis of a return of interest on the capital expended. If this plan had been adopted there could have been no charge of "profiteering" against the industry. It should be quite practicable for the Government and owners to agree within a very short time on prices for the new ships which would simply allow the buyers a fair rate of interest on their money and permit them to set aside the usual amount annually for depreciation. The employment of the vessels would be directed by the State precisely as it is now. By such a plan the State would recover the bulk of its vast expenditure in tonnage and money would again be diverted into shipping which may now be put to a far less satisfactory use. And much would be done to put the shipping industry in fighting trim and prepare for the time when the welfare of the nation will depend, more than ever before, on individual brains, skill and enterprise.

Shipping After the War

Sir Owen Philipps, chairman of the Royal Mail Steam Packet Company, took the opportunity afforded by the annual meeting of that undertaking to tender to the Government some advice regarding its relations with the shipping industry after the war. At the present time, he said, the company's business was more completely under Government control than at any previous period of the conflict, and admitted that after the return of peace a certain amount of Government control over shipping might be necessary for a very brief period in order to ensure essential supplies, but the sphere of Government control should be limited to enforcing proper rules and regulations in regard to the construction of ships, their seaworthiness, equipment, manning, etc., and to securing as far as practicable fair play for British shipping in competition with foreign nations—more especially where foreign shipping is either directly or indirectly State-aided. No British industry,

said Sir Owen, is less adapted to State ownership than shipping. It has been created and built by successive generations of strenuous and enterprising men, and it is difficult to conceive that the world-wide ramifications of Britain's maritime trade could possibly be upheld and expanded by Government officials, however able and efficient in their own sphere. In the case of an industry so highly specialized as shipping, with interests all over the world open to universal competition, the chairman expressed his conviction that by taking it out of the hands of those who have won for it the high position it has occupied hitherto and placing it in the hands of a Government department the nation would be running a grave risk of losing that maritime supremacy which, whether in peace or war, was essential to the maintenance of Britain's position as a world power. A measure of Government control in many industries will undoubtedly be necessary in the early days of peace, but it should be restricted to the actual needs of the situation, and be terminated the moment that course can be safely adopted.

Fabricated Ships

One of the most interesting developments of the shipbuilding push in which Great Britain has led the way is that of fabricated ships. A fabricated ship is a vessel the component parts of which are manufactured in other than shipbuilding yards. These component parts are transported to shipbuilding yards, assembled there and put together as complete ships. There were many industrial establishments in the country doing work closely resembling shipbuilding and marine engineering. Among them were bridge-building yards and land-engine factories. The majority of these were in centers remote from launching water, and how to utilize them efficiently was a difficult problem. It was solved by the adoption of fabrication. A ship was designed whose material could be satisfactorily made in the bridge yards. This vessel is larger than most of the standard ships, and it has not a curved frame. Size and weight of unit construction are limited, so that transport is easy and powerful gear for placing it in position unnecessary. In order to avoid the difficulties as regards machinery, geared turbines are being used instead of reciprocating engines. Every part of the complete ship can be made in inland establishments near steel mills, and transported by ordinary means to the seaboard.

With all the slips in private yards filled, it was necessary to look elsewhere for sites for assembling yards. The national shipyards in the West of England were laid out for the new purpose, and private undertakings of the same character exist or are projected. In carrying out its plans the State has a call on labor which is not available to contractors. The bulk of this labor is unskilled, but it is being trained in the use of pneumatic riveters and caulking tools, and will be sufficiently expert to put the fabricated ships together.

The fabrication of the materials of ships and engines has now been organized over a considerable area, local committees being responsible in certain districts for definite deliveries of a ship, or a number of ships, within specified periods. Besides, fabricated ships are taking shape in several assembling yards, and before long vessels of the type should represent a considerable addition to the tonnage output.



The Peninsula Shipbuilding Company

LESS than two years ago the Peninsula Shipbuilding Company began laying out its plant at the foot of McKenna avenue, and today its four building ways, complete fitting out dock and its favorable position adjacent to a large and modern sawmill make it one of the leading plants of the Columbia River district.

This company has specialized from the first. Of the eight vessels so far launched from the Peninsula plant the first four were auxiliary schooners, in which Winton engines were installed, and these were followed by vessels of the exclusive Peninsula type of 4,000 tons deadweight capacity, and both larger and of different construction than either the Ferris or Hough type ships.

Mr. F. C. Knapp, president of the corporation, has been the guiding spirit in the development of the plant, and interested with him are some of the best known financial and business men in Oregon.

For the Emergency Fleet Corporation, the Peninsula Shipbuilding Company has launched the steamers Clackamas, Bell Brook, Anoka and Cresap. These vessels are 287 feet long over all, 269 feet between perpendiculars, 49 feet 8 inches extreme beam, and 27 feet 6 inches depth of hold. They are designed for 26 feet load draft, have engines of 1500 horse-power and an estimated load speed of 10.5 knots. Their bunkering capacity will give them a radius of 4500 miles.

The vessels are being powered with Scott water tube boilers and the latest type of Westinghouse turbines with reduction gearing, which will give

them a distinct advantage over the reciprocating engine-driven ships, in that the wear and tear on the vessel which would result from using reciprocating machinery is entirely eliminated. It is also being daily demonstrated in vessels of all types in operation that the geared turbine can successfully compete with the reciprocating engine as regards economical running.

Although the Peninsula ships exceed the standard government ships in deadweight capacity by about 15 per cent, they also have an excess of about 225 horse-power, which will enable them to carry this additional cargo at a slightly increased speed, both of which points are of great value under present conditions.

The lines of these ships have been worked out with somewhat greater deadrise than the average cargo vessel and the entrance and run have been made extremely easy. These features will make the vessels much easier in a sea when running light and will undoubtedly prolong their lives by eliminating excessive pounding.

As regards hull strength, the addition of a steel box keelson, wood-filled and thoroughly protected from corrosion, while in no way decreasing the cubic capacity of the ship, gives additional center line stiffness, which is invaluable.

The method of kneeing the 'tween deck shelf both above and below in way of the machinery space and hatches also stiffens up these points to a degree considerably in excess of either Lloyds, Bureau Veritas or American Bureau requirements.

Additional steel fore and aft peak tanks have been incorporated for ballast purposes when running light. It has been demonstrated that the worst feature of the war zone trade, outside of the submarine menace, has been the excessive strain to which vessels returning light across the Atlantic have been subjected. In a great many cases no ballast whatever has been available and almost invariably these vessels have had to pay the dry docks an extensive visit. The tanks mentioned above will reduce this trouble to a minimum.

The plant has a fitting-out dock 1000 feet long and arrangements are under way to provide an inside basin so that fitting-out berths will be available for six vessels at one time. It is understood that the Peninsula Shipbuilding Company will continue to turn out its own type of craft for the present, though later, when all the details are worked out for the government's five thousand ton wooden carriers, the plant may be called upon to take up this type of construction.



Laying the keel timbers for a big wooden ship at the Peninsula Shipbuilding Company's plant.



Forward end of the house on one of the Peninsula ships, showing arrangement of hatch and winches.

OREGON DISTRICT LAUNCHINGS

Records made in shipyards of the Oregon district since January 1 have drawn attention from many sections, but one in which there is general pride, and overshadows some of the work done on the East Coast, was the launching of six Ferris ships July 13 by the G. M. Standifer Construction Corporation. Four of the ships, the Alvonía, Montezuma, Umatilla and Belding, were floated from the North Portland yard, where the present organization started under the name of the Standifer-Clarkson Company, and two of them, the Moosabee and Benzonia, left the ways at the Vancouver plant.

They were Ferris ships of the twin screw design and represented a combined deadweight capacity of 21,000 tons. There have been yards floating more tonnage in a day, as two or three of some of the big steel ships would equal that in deadweight, but numerically it is believed the showing surpasses any a single shipbuilding corporation has accomplished.

In fact, the total was only one less than was floated in the entire Oregon district July 4, one ship being launched at the Grant Smith-Porter Ship Company's yard here, the Necolah, and six were launched on the lower Columbia—the Benvola and Cotteral by the McEachern Ship Company; the Bonifay, at the Wilson Shipbuilding Company's plant, and the Blue Eagle at the yard

of the George F. Rodgers Shipbuilding Company, all of Astoria, while the Wanzu and Maratanza were floated at Columbia City by the Sommarstrom Shipbuilding Company.

The Columbia River Shipbuilding Corporation launched the 8800-ton steel steamer Western Coast July 6, and July 8 the fourmasted schooner Georgette was launched by the Columbia Engineering Works; the Western Main was sent down the ways by the Northwest Steel Company, and the Ferris ship Nashtoh by the Grant Smith-Porter Ship Company. The Ferris ship Cabeza went overboard at the yard of the Coast Shipbuilding Com-



Ship No. 38 ready for launching at the Peninsula Shipbuilding Company's plant.

pany July 10, and the St. Helens Shipbuilding Company floated the five-masted schooner John W. Wells July 9.

The original Fourth of July programme provided for about 90,000 tons of ships being released from the ways, but above Columbia City freshet conditions were such it was decided not to risk wholesale launchings.

THE RIGHT KIND OF RIVALRY

Rivalry between wooden shipbuilders in this State has been heightened, following the action of the Emergency Fleet Corporation in announcing the award of a "best progress" prize every two weeks, that to be in the form of a string of code flags, spelling the words "best progress."

The Grant Smith-Porter Ship Company has held first place since the inauguration of the practice, which was after the work in all yards for the first two weeks in June had been checked. The Supple-Ballin Shipbuilding Corporation of Portland and the McEachern Ship Company of Astoria have been in second place at times, but the Grant Smith-Porter force manage to hold their own.



Waterfront of the Peninsula Shipbuilding Company with vessels at the fitting out dock.

In deciding to adopt the system, Lloyd J. Wentworth, supervisor in Oregon for wooden ship construction, advised each company as follows:

"It has been decided by the Emergency Fleet Corporation that in order to create enthusiasm and friendly rivalry among the employes of your various yards in the Eleventh District, to donate a flag, or set of international code flags, spelling out the words "Best Progress," which will be awarded to the yard showing the best per cent progress in construction per hull of all hulls on the ways under construction every two weeks for that period.

"This set of flags will travel from yard to yard, according to the best progress of work, as shown by the reports submitted to this office on the 15th and last day of each month. The award to be based solely upon the per cent of gain per hull on ways irrespective of all other consideration and conditions.

"These flags will be flown by the successful builder on their flag staff immediately below the United States Shipping Board official flag, for a period of two weeks, until the next award is made to another yard, unless the yard holding the same by the showing made by the reports for that period is again shown to be the winner for best progress.

"Yards will be furnished each period with a statement showing the pro rata standing of all yards in the district based on the percentage of work completed per hull average for period just elapsed."

MR. SCHWAB'S VISIT

He came, he saw and conquered, might fittingly be applied to the mission of Charles M. Schwab, director general of the Emergency Fleet Corporation, who was in Portland July 13, 14 and 15, for his arrival created a stronger and newer interest in affairs maritime, and his survey of the field, always with the counsel of Charles Piez, vice-president and general manager of the corporation, brought about a speeding up in work, as well as the completion of details concerning the new steel plant of the Northwest Steel Company.

There was no shipyard establishment in the Portland zone, which is engaged on Federal work, that escaped the presence of the officials, nor were there any managers who wished to. Mr. Schwab and Mr. Piez proved they were outspoken in advising speed or asking as to the reasons for delays in some instances, mostly because they did not appreciate some conditions affecting machinery deliveries and the like, while they were most generous in their commendation of work and workers.

There was nothing said by them of a praiseworthy application that was regarded as insincere, but, coming as they did into such a large field of wooden shipbuilding, standing at the gateway of the forests of the Northwest, and being afforded every opportunity to study the wooden ships at close range, they would not have been human had they not shown appreciation of what such a situation insured in the programme for ships.

Then Mr. Schwab witnessed the launching of the Moosabee at the Vancouver plant of the G. M. Standifer Construction Corporation, it being the first wooden ship he had seen take the water, and, she being one of six floated that day in his honor, an arrangement that broke the record for a single shipyard management, he was doubly pleased.

It was imparted to the builders of wooden and steel ships that there need be no fear of the future work, it being estimated that in the next year \$200,000,000 worth of vessels would be turned out in this district, and that all ways would be kept supplied, except at yards falling behind in their schedule. It was not said that any such plants were numbered in the Oregon district.

The officials, in addresses to shipyard forces, talked as plainly as to the employers, and it was set forth that each might comprehend that all were engaged in laboring for the government. The position of the employers was held up for the enlightenment of the men, it being told that all were striving for the same end and any dissatisfaction as regarded wages would be justly adjusted, so there was not, at any time, occasion for strikes, even should such be suggested by unwise leadership.

There was one matter that stood out prominently in connection with the presence of the officials, that being their willingness to go into conferences with builders on all subjects. Hours were arranged that subjects might be taken up, and in some cases they no doubt saved trips to Washington or else lengthy periods of correspondence, with chances that the end sought might not be attained them.

PLANT FOR CONCRETE BARGES

Provision for the construction of concrete vessels is being made by the Great Northern Concrete Shipbuilding Company, of which Joseph Paquet, a man who figured in the building of inland vessels for years, is president. G. W. Gilbreth, manager and chief engineer, is at Washington to close contracts with the Quartermaster Department for building five concrete tank vessels, to be 100 feet long. The company was the lowest bidder on five of eleven vessels wanted and the total bid is said to have been \$399,990.

The plant has been started at Vancouver, Wash., and the first vessel is to be ready in five months and one each month thereafter until all are ready. They are to be fitted for carrying half of their deadweight capacity in oil or water and the remainder of the space is reserved for general freight. They are to have a beam of 12.6 feet and depth of hold of 10 feet.

The Standard Gas Engine Company of San Francisco is to furnish gasoline power for the vessels, they being designed for twin gasoline engines of 250 horsepower.

Mr. Paquet had formed the Paquet Concrete Shipbuilding Company in June with the intention of obtaining permission from Washington to lay out a plant, and then joined interests with the Great Northern corporation.

The new concrete steamer Faith was in the harbor for a week during the early part of July, and her appearance and operation have attracted others toward that class of construction.

E. R. Adams, of Seattle, manager of the firm of Alexander & Baldwin and Puget Sound agent for the Matson Navigation Company, was here early in the month to accept delivery of the 3800-ton steel steamer Point Bonita, built by the Albina Engine & Machine Works.

The Shipping Director Visits Portland

ONE event of the past month will long be retained in the memory of shippingmen of Portland and the Columbia River region, that being a visit of John H. Rosseter, manager of the W. R. Grace Company marine and importing business, paid this city July 12. He came as John Rosseter, newly appointed director of the bureau of operations of the Emergency Fleet Corporation, and as such he was doubly welcome, first because of his acquaintance with the port, its facilities and conditions; and second, because he was in a position to impart valuable advice in connection with the study he was making of what is most needed for the operation of the big American fleet after the war.

About forty of the most prominent shippers, grain exporters, port officials and representatives of commercial bodies, who met Mr. Rosseter at a complimentary dinner, as well as a few others who were with him on an inspection of the harbor and ship plants, were made to feel as if San Francisco and Portland were closer than before. In fact, it was just such a closer relationship that Mr. Rosseter argued for in a most pleasing talk he gave following the dinner.

Stress was placed by him on the great get-together movement that must follow the war in the interest of the future operation of vessels. He said, necessarily, such a fast acquaintance and regard between cities would be productive of material gains in an ordinary commercial way, as, for example, exchange of commodities between them, but it needed just such a change in every area of the broad union to bring the interest in the mercantile marine to a point that justified the operation of the big fleet.

"What are we to do with from 15,000,000 to 20,000,000 tons of shipping after the war?" was the text of a query he propounded.

There were some present who had thought the fear uppermost was that we would not have enough ships. Mr. Rosseter's exposition of changes he expected to follow altered their ideas. He said it was not a matter for Portland, San Francisco and Seattle to face alone as regards the Pacific side, nor for New York, Galveston and New Orleans to worry about on the other side, but the inland localities were no whit less concerned. The Rocky Mountain region must come to the assistance of the Coasts as well as that territory immediately bordering on the Coasts.

"After the war, if you of Portland come to Washington for ships to operate from the Columbia River, what sort of an argument will you advance to obtain them?" he asked. "I regard Portland as one of the most substantial and law-abiding communities on the Coast and her one fault is that she has suffered from ultra-conservatism. You have specialized in deep-water trade. The time has arrived in which variety is the keynote and that sort of business must be established to warrant a continuous and dependable movement in after years, when peace again is our's."

Low rates, perhaps not such as prevailed immediately before the European conflict, yet much below the present charges, must be looked for, he reminded them. Great Britain must maintain her trade and Japan was building her fleet into vast

proportions and harboring a working fund to meet competition, and other nations would be in the trade arena, so the United States, with all of her power and resources, would be pitted against others in another war, a war for trade, not one of bloodshed and possession or control of countries by force.

In going through the harbor, Mr. Rosseter was as frank and helpful in pointing out suggestions for improvements and additions in facilities as he was in a more general talk of varied necessities. He told the Portlanders that the new St. John's municipal terminal, where a grain elevator, to have a capacity of 1,000,000 bushels, is under way, and a 1200-foot pier and slip is about ready, should number with its features an adequate fuel oil storage, also an oil barge, so the liquid fuel could be conveyed to vessels as they were discharging or loading. He told them oil storage for soya bean and cocoanut oil should be provided, also refrigeration for 2500 tons of commodities would be an asset in the kind of trade that must be handled later.

He made a most welcome impression when he rated the 10,000-ton Port of Portland's Commission's drydock as insufficient for the present purposes, to say nothing of later calls for lifting ships, and advised that there should be a larger dock as well as a smaller one. As Mr. Rosseter is a member of the Port Facilities Committee at Washington, before which applications for new drydocks are considered and which body authorizes appropriations for drydocks, providing communities wanting them prove they are qualified to operate them and have convincing arguments why they should be established, it is most probable that an early application will be made along the lines he suggested.

In that connection he said his experience had shown one of the most necessary adjuncts to a port's working gear was a barge equipped as a machine shop, having a plant aboard also to furnish power for working winches, supplying electric energy for lights and power and pumping water, so when a large vessel arrives from an off-shore voyage the barge might go alongside and all functions be performed as regards cargo machinery, with the other equipment ready to make repairs, wash down boilers and the like.

John H. Rosseter left a bountiful supply of food for thought in Portland. His ideas and offers of assistance were in accord with what interests here appreciate must be done. He offered to assist only so far as his experience enabled him, and he asked for help for the operation of the new fleet, asking for aid in a manner that can only mean that in helping him as an official of the Emergency Fleet Corporation to creditably carry out his obligations, this community and the entire State would simply be helping the future of Oregon and insure its stability.

Harry L. Corbett, president of the Portland Chamber of Commerce, arranged the dinner for Mr. Rosseter at the Arlington Club, and other guest were: Mayor George L. Baker; William D. Wheelwright, president of the Pacific Export Lumber Company; W. J. Burns, resident manager of Balfour, Guthrie & Company; W. J. Ganong, vice-

president and general manager of the Portland Flouring Mills Company; W. B. Ayer, president of the Eastern & Western Lumber Company and United States Food Administrator for Oregon; Colonel George A. Zinn, Corps of Engineers, U. S. A., in charge of harbor improvements; Col. Brice P. Disque, Signal Corps, U. S. A., in charge of spruce production in the Northwest; Joseph R. Bowles, president, and Walter B. Beebe, vice-president, of the Northwest Steel Company; Nathan Strauss, manager of Fleischner, Mayer & Company and chairman of the Trade and Commerce Bureau of the Chamber of Commerce; Captain John F. Blain, supervisor of the Northwest on steel ship construction for the Emergency Fleet Corporation; Lloyd J. Wentworth, supervisor of wooden ship construction in the Oregon district; C. D. Kennedy, manager in Oregon for the bureau of operation of the Emergency Fleet Corporation; H. B. Van Duzer, head of the Fir Control Board in the Northwest; Charles B. Moores, chairman of the Commission of Public Docks; B. F. Stone, president of the Port of Astoria Commission; Max H. Houser, manager in the Northwest for the United States Food Administration Grain Control Corporation; Walter L. Lang, surveyor in charge of Lloyd's Agency in Oregon; Bert C. Ball, president of the Williamette Iron & Steel Works; J. C. Ainsworth, president of the United States National Bank; Emery Olmstead, president of the Northwestern National Bank; George McDowell, shipping and brokerage; C. C. Colt, president of the Union Meat Company; G. M. Trowbridge, managing editor; and B. F. Irvine, editorial writer of the Oregon Journal; Guy Talbot, president of the Portland Gas & Coke Company and Pacific Light & Power Company; L. Allen Lewis, president of Allen & Lewis; Charles F. Swigert, vice-president of the G. M. Standifer Construction Corporation; A. F. Smith, president of the Columbia River Shipbuilding Corporation; L. B. Smith, in charge of the Oregon agency of the War Trade Bureau; Peter Kerr, president of Kerr, Gifford & Company; C. B. Woodruff, manager of W. P. Fuller & Company; Will H. Moore, Collector of Customs; G. B. Hegardt, chief engineer for the Commission of Public Docks; R. D. Inman, president of the Port of Portland Commission and the Inman-Poulsen Lumber Company; and George C. W. Low, of the Supple-Ballin Shipbuilding Corporation.

SHIP DELIVERIES

For six months ending June 30, Portland plants delivered to the United States Shipping Board 20



Main bay and gallery in the shop of one of Portland's busy plants, that of the Smith and Watson Iron Works

completed vessels, 17 of them steel carriers. They had a combined deadweight tonnage of 139,400. During June four steel freighters, each of 8800 tons, and two of 3800 tons each, were delivered, as well as three wooden ships of 3500 tons each. The ships delivered and their tonnage were as follows:

Vessel, type, when delivered:	Tonnage
Westwind, steel, January 2.....	8800
Point Arena, steel, March 2.....	3300
Westward Ho, steel, March 4.....	8800
Westchester, steel, March 17.....	8800
Point Loma, steel, March 20.....	3300
Westbrook, steel, March 30.....	8800
Westshore, steel, April 15.....	8800
Westgate, steel, April 23.....	8800
Westgrove, steel, April 26.....	8800
Westhampton, steel, May 13.....	8800
West Indian, steel, May 22.....	8800
Western City, steel, June 3.....	8800
Western Wave, steel, June 8.....	8800
Wasco, wood, June 4.....	3600
Western Ocean, steel, June 17.....	8800
Point Bonita, steel, June 24.....	3800
Biloxi, wood, June 25.....	3600
Point Lobos, steel, June 30.....	3800
Western Chief, steel, June 30.....	8800
Kasota, wood, June 30.....	3600

W. D. B. Dodson, executive secretary of the Chamber of Commerce, is again at his desk after a tour of the East, where he went on business connected with shipbuilding here and prospects for the introduction of new trade and steamship facilities following the war.

S. A. Stuart has been named safety engineer of the Oregon District of the Emergency Fleet Corporation, his responsibilities being to carry out "safety first" principles in plants as to machinery and look after sanitation at the same time.

Among the Portland Shops and Shipyards

IT is estimated that the new fitting-out plant of the Pacific Marine Iron Works, located on the East Side waterfront, between Belmont and East Taylor streets, two blocks north of the main machine and boilershop of that corporation, will entail an expenditure of \$200,000. Berths will be available for ten vessels, and besides those of the Supple-Ballin fleet, those turned out by the St. Helens Shipbuilding Company and the Columbia City yard of Sommarstrom Brothers are to be fitted out there under contracts with the Emergency Fleet Corporation.

The first of the Supple-Ballin ships, they being composite vessels designed by Fred A. Ballin, was turned over to the Emergency Fleet Corporation during the month, she being the Calala, launched April 18. The vessel is of 4500 tons, deadweight, and has a triple expansion engine built by the Pacific Marine Iron Works; also two Ballin water-tube boilers constructed there after the design of Mr. Ballin.

Arrival with the Schwab party of Dr. Charles A. Eaton, well known New York divine and head of the National Service Section of the Emergency Fleet Corporation, lent new impetus to the work of that section in Oregon, which is directed here by C. W. Tebault. At the time of the coming of Dr. Eaton, Dr. David Hughes, chaplain in the British Army, with eighteen months' service, and Lieutenant C. R. D. Schagel, also of the British forces, were touring the yards, and they made decided impressions on the men in unfolding some of their experiences with the Germans.

Relative to recent visits of members of the French High Commission, who are interested in the work of the Foundation Company, where steam auxiliary schooners are building for the French government, it is said the French are considering awarding contracts for twenty additional carriers of the type, making forty in all for the Portland plant. Of twenty first contracted for, eleven have been floated and one completed ship was delivered in June, followed by four others in July.

Of fourteen steamers floated by the Grant Smith-Porter Ship Company, six have been delivered, the fourth finished, the Blandon, having been assigned to the San Francisco & Portland Steamship Company to ply between this city and the Golden Gate in the freight service. She was turned over because of the Navy having impressed the liner Beaver into service. The plan of the line is to use the Rose City for passengers as far as Los Angeles, carrying freight mostly for the southern port, with small amounts for San Francisco. It is the understanding here that the use of the Blandon is to establish whether there is sufficient business these times to warrant a second carrier being operated.

One change record early in July was the election of Charles F. Swigert, manager of the Foundation Company's plant, as vice-president of the G. M. Standifer Construction Corporation, with which he is now actively associated. The Pacific Bridge Company, of which Mr. Swigert is president, is a partner with the Foundation Company in the Portland plant, so Mr. Swigert does not sever his relations altogether. In his stead H. C.

Campbell, secretary of the Pacific Bridge Company, is acting as manager of the yard.

Announcement was made during the month by the Pacific Coast Coal Company that it would erect a modern and larger plant and bunkers here; plans have been prepared providing for a maximum storage capacity of 20,000 tons of fuel, 5000 tons of which would be in the bunkers and 15,000 tons in flat storage. There will be a special high tower constructed so that new vessels, "flying light" so they stand high above the dock and interfere with ordinary loading chutes, can be given coal regardless of the stage of water. The Port of Portland Commission has agreed to dredge in front of the property to facilitate the foundation work. It is estimated the new plant will be finished in four months, the work being prosecuted so as not to interfere with the operation of the existing bunkers.

Completion of the annual Summer survey of the entrance to the Columbia River July 11 showed the 40-foot channel project completed, for there is a least depth of 40 feet at low water for a width of half a mile, while on the entrance ranges the depth is 41 feet. Though Congress provided for no additional work on the project when that depth and width had been attained, the dredge Chinook is to be continued there to maintain the waterway at the present depth and area. Since the June freshet has subsided, dredging is under way on the Lower Columbia to maintain the 30-foot depth.

United States Steamvessel Inspectors Edwards and Wynn shifted their moorings last month from the Custom House to the tenth floor of the new Gasco building, Fifth and Alder streets. A collection of steamship and steamboat mementos, also souvenirs of the seven seas and elsewhere, that graced Captain Edwards' office for thirty years, was disposed of through presentation to friends and various marine societies before the move, so the new quarters have bare walls in contrast to the old offices.

William Cornfoot, president of the Albina Engine & Machine Works, has displayed his desire to help youngsters in his employ by offering free scholarships in shipbuilding to men of the machine shop force. Already some have been granted.

Vaccination of all shipyard employees against smallpox is urged by the Oregon State Board of Health, the United States Shipping Board having requested such a step because of the fear of an outbreak of the disease in some cities where housing conditions are not satisfactory.

Payment was made during the month to long-shoremen of various amounts, from 15 cents to \$26.90, representing back pay allowed by the government between April 13, when they asked for an increase, until May 3, when an adjustment board granted a raise from 65 cents an hour straight time to 80 cents and from \$1 an hour overtime to \$1.70. It was estimated that the total payments at Portland reached \$3000.

Robert Grav and associates have formed the Williamette Brass Foundry and are negotiating for a lease on waterfront property from the Southern Pacific, lying north of the Harriman bridge on the West Side. Application has been made to the

Commission of Public Docks for authority to proceed with the erection of buildings. The plant is to be established in connection with the war work on vessels. The Oregon Brass Works, which has added a second unit to its plant because of the rush of business, has applied to increase the size of a storage building at the foot of Everett street, where the old plant of the Portland Gas & Coke Company has been turned into a foundry temporarily.

When the new steel steamer *Western Spirit* was delivered by the Northwest Steel Company the latter part of July, she was turned over to the Navy by the Emergency Fleet Corporation, and her commander is Lieutenant Commander Howard H. Rees, erstwhile Captain Rees of the old steamer *Portland* and more recently master of the 8800-ton freighter *Westbrook*, which he delivered on the other side. The executive officer aboard the *Western Spirit* was Lieutenant Robert Chesney, better known on the Coast as First Mate Bob Chesney, who sailed in the McCormick fleet and other lines.

It has been determined not to apply the prefix "Point" to more of the 3800-ton steel steamers building at the plant of the Albina Engine & Machine Works, so that Point Adams, to be delivered shortly, will be the last. The names of the next four vessels to be launched there will be Cadaretta, Caddopeak, Callabasas and Calamine. New names for hulls to be built by the Northwest Steel Company will include the *West Cherow*, *West Celeron*, *West Chana*, *West Chaska*, *West Chatala*, *West Chestoa* and *West Cheswald*.

It has been reported that George C. W. Low, treasurer of the Supple-Ballin Shipbuilding Company, who became identified with the plant several weeks ago through his purchase of the stock of Joseph Supple, had also acquired that of Fred A. Ballin. The corporation has delivered one of eight ships under contract for the government.

Members of the Grainholders' Union have petitioned dock operators for an increase in the wage scale, but conferences between representatives of each at the Merchants' Exchange resulted in a decision to await action on Puget Sound, with the expectation of having an equitable scale in effect.

What is said to be the largest sailing vessel of her design built on the Pacific side is the five-masted topsail schooner *John W. Wells*, intended for the Charles R. McCormick fleet, which took the water at the yard of the St. Helens Shipbuilding Company July 9. It is said she will carry about 3,000,000 feet of lumber, and while originally laid down as an auxiliary, it is not intended to install propelling machinery at present.

So rushed are boiler plants here that the government was unable to obtain bids for a new boiler to be installed in the steamer *Mathloma*, used for dredging and snagging on the Upper Willamette River, so contracted with the Ruemmell-Dawley Manufacturing Company of St. Louis, for one at \$7320, delivery to be aboard a car at St. Louis.

After a suspension of several months, the Dalles-Columbia line has resumed a daily steamboat service between Portland and Arlington, the latter point being on the Upper Columbia, above the Dalles-Celilo locks.

Principally in the interest of salmon fishermen,

Robert Warrack, superintendent of the Seventeenth Lighthouse District, has caused a bell buoy to be established to mark the end of the south jetty at the entrance to the Columbia River. In the past a nun aid has been maintained there.

Under a contract entered into with the G. M. Standifer Construction Corporation, the Hesse-Martin Iron Works will furnish \$104,000 worth of equipment for new vessels at the former's yards. Manufacture of anchor and cargo hoisting machinery has been specialized in by the Hesse-Martin organization for a lengthy period, and they have filled a number of contracts since the war rush started.

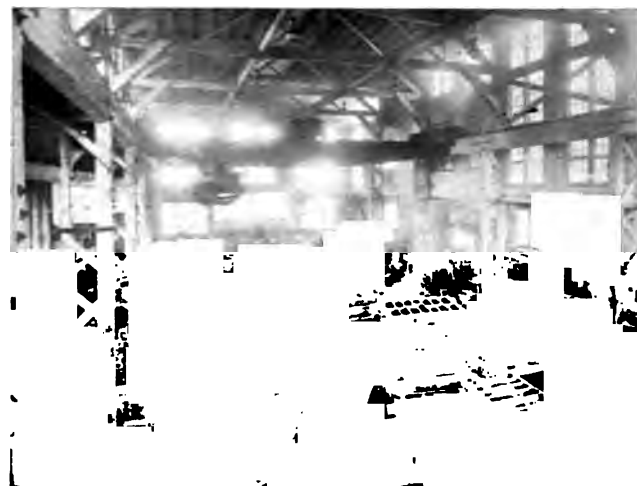
To determine whether to provide a concrete hull for the dredge *Columbia*, a 30-inch machine which has a wooden hull that is deteriorating, the Port of Portland Commission has entered into a contract with Rasmussen & Grace to furnish preliminary plans and specifications for a stone hull.

Statistics show that for the cereal year the value of exports from Portland exceeded those of the preceding period by almost \$6,000,000.

Managers of yards not having Federal ships to turn out received a shock early in July, when informed by the Emergency Fleet Corporation that a programme to build a number of ocean-going wooden barges on the Pacific Coast had been dropped. It was promised that such yards would be favored and bids had been solicited for the work. The original intention was to have about 200 of the vessels. It is reported that some are yet to be ordered on the Atlantic Coast.

To meet the demands of its rapidly-increasing business, and at the same time centralize its stores as near the main plant as possible, the Willamette Iron & Steel Works has under way a warehouse adjoining the administration building that is 300 feet long and 70 feet wide, having a height of 40 feet. It will contain three galleries, with an elevator and crane bay, also two railroad tracks, for the convenient handling of the equipment.

Having four new keels in place, all started the same day, was the way the Albina Engine & Machine Works led off in July. The plant had been inconvenienced for some time because of the tardy arrival of steel, so when sufficient of the fabricated material was ready it was arranged to start the keels together.



Interior of foundry at Hesse-Martin Iron Works. 7
just received large orders for ship equip

Oregon's Place in the Nation's Shipbuilding

TO acquaint the maritime world with facts relative to Oregon's share in ship construction, as well as to undertake the posting of the public elsewhere on varied topics from this region, the Chamber of Commerce has opened a news service bureau, in charge of which is Sydney B. Vincent, for several years manager in Oregon for the Associated Press.

Mr. Vincent has issued the appended resume of shipwork here:

"The history of shipbuilding in Oregon for the past thirty months is one of remarkable achievement. Almost unknown as a shipbuilding center in 1916, Portland today occupies a pre-eminent position as a producer of wood and steel vessels. Shortly after war was declared, a few scattering contracts were placed. So splendid was the record that more and more contracts became available, with the result that today four immense plants are building steel vessels, while in the district seventeen yards are building ships of wood.

"July 11, according to statistics compiled by the Chamber of Commerce, Oregon had produced twenty-six steel cargo vessels and ninety-six wood ships had been launched. Ships on the ways, under construction and awaiting launching, numbered ninety-four, of which eleven are steel ships. Unfulfilled contracts on hand in the Portland district totaled the immense sum of \$200,000,000.

"The development of the steel ship industry in Portland is worthy of special note. In Oregon, and directly tributary to Portland, the greatest lumber manufacturing city in the world, is a stand of commercial timber officially estimated in excess of 560,000,000,000 feet, and yet Portland has in less than three years become one of the steel shipbuilding centers of the country. This remarkable development partly is attributed to the climatic conditions which prevail. Men can work every day in the year. There are no extremes of heat or cold, and workers, not only in the steel and wood shipbuilding industries, but in all lines of industrial activity, produce more work in a given time than in climates not so favorable.

"The statistical bureau of the Chamber of Commerce has compiled the following table, which tells in figures just what has been accomplished in the shipbuilding industry in Oregon:

	Dec. 10, '16	July 9, '18
Plants building steel ships.....	3	5
Plants building wooden ships.....	6	17*
Number of employees	4,200	41,400†
Monthly payroll	\$302,400	\$3,974,400
Steel cargo ships launched.....	0	26
Tonnage of steel ships launched	0	202,400
Wooden ships launched	4	96
Tonnage of w'd'n ships launched	18,500	349,800
Cargo ships in ways not launched	11	94
Tonnage of ships in ways not launched	48,000	370,400‡
Total amount of contracts unfulfilled	\$22,250,000	\$200,000,000
*Three under construction.		
†Portland		35,200
Outside of Portland		6,200
Total		41,400
‡Steel		76,800 ton
Wood		293,600 ton
Total		370,400 ton

No. of vessels launched:	1916	1917	1918
Wood	4	31	61
Steel	0	8	18
Tonnage:			
Wood	18,500	117,800	213,500
Steel	0	61,600	140,800
Total	18,500	179,400	353,300

INTEREST IN HYDRAULIC PLATE TIGHTENER

No patent applied for during the present war has caused as much comment in shipbuilding circles as has the hydraulic plate tightener that has just been patented by Mr. A. B. Clark, president and manager of the Hydraulic Appliance & Equipment Company.

It is a very compact machine, weighing only 45 pounds, and is guaranteed to lift thirteen tons. One man can draw a steel plate in place in five minutes, while it would take a bolter up crew four hours. It is estimated that it will take the place of twenty men and will cut down the time of a vessel ten days.

The best recommendation for Mr. Clark's plate tightener is that he sold every steel yard in Seattle within thirty days after applying for his patent. The offices of the Hydraulic Appliance & Equipment Company as located in Seattle.

SHIPPING LEGAL CASES

One of the notable features of current litigation is the large number of shipping cases. On the cause list of the House of Lords there are no fewer than seven appeals bearing on the many-sided aspects of this branch of the law. The recent experience of the High Court shows an unusually high proportion of important shipping cases. The war and the effect of Government requisitioning has been apparent in much of this litigation. For instance, the extent to which owners of requisitioned vessels are able to claim awards for salvage services is one of the matters on which the decision of the Law Courts has just been sought. One very interesting case is under appeal to the House of Lords. A vessel was left by her crew under threats of violence from an enemy submarine, and notice of intention to abandon was given. The means which the Germans took to sink the ship failed to accomplish that end, and the vessel was eventually salvaged and brought into port. In determining the rights of parties under these conditions the Court of Appeal was not unanimous. There are several points of great interest to shipowners in the case.

FRENCH IN THE FAR EAST

"Jimmy" French, chief surveyor to Lloyd's Register in this country, and who maintains his headquarters in New York, is at present in Japan looking after the classification of new tonnage. Mr. French is well known on the Pacific Coast, where his visits are looked forward to with pleasure by a wide circle of acquaintances.

Mr. J. H. Mull, formerly vice-president of the William Cramp & Son Ship & Engine Building Works of Philadelphia, has been elected president to succeed Harry W. Hand, who has resigned after a life-long association with the big Philadelphia shipyard.



Exports and Our National Duty

By Geo. Ed. Smith,
President American Manufacturers Export Association

TODAY the business man of the United States is on the crest of a tidal wave of prosperity. The people of the United States are making more money than they ever made before, and they are spending it here in America. The nation is piling up a colossal debt in order to purchase the products of American factories. Millions of men have been called into the army and by that act have assured employment for those who stay at home. In the last three years there has been a steady stream of gold into the nation from abroad until this nation's credit balance, which in 1914 amounted to \$324,000,000, has increased more than tenfold to the stupendous sum of \$3,250,000,000. We have more gold today in the United States than was ever held by any nation since the beginning of civilization.

To meet the demand upon American factories, both in munitions of war and in staples which heretofore have been manufactured abroad, there has been an enormous expansion of American plants. New buildings have been erected, new machinery has been bought and put in place, and capital has been heavily invested in these extended plants. Much of this capital invested has been written off and more will be written off by war profits. But it must be remembered that our economic life has already adjusted itself to these new conditions and the capital involved is only one phase of the problem presented by these extended plants.

For the ten years preceding the European war, the domestic trade of the United States increased at a rate of approximately one billion and a half a year. During the same years, America's foreign trade increased at the rate of approximately \$250,000,000 a year. A comparison of this natural increase with the sudden increase brought about by the war gives us food for thought. During the past year the increase in the domestic trade of the United States was \$18,300,000,000, or more than twelve times the natural yearly increase before the war. Similarly the increase in our foreign trade during the three years of the war has been at the rate of \$1,700,000,000 a year, or nearly seven times the former rate.

When peace comes, as come it must, it will bring with it a readjustment which we must prepare to face with wisdom and courage.

The domestic markets of America, after that readjustment, will be opened once more to foreign manufacturers; the world trade, which now invites us, will afford the warring nations of Europe the opportunity to rebuild their fortunes. At home and abroad, the American business man will find himself engaged in a competition more energetic than he has ever known before.

There is no occasion for me to draw a picture of what a period of contraction would mean to the country, but the effects of this contraction would touch not the manufacturer alone, but would ramify through natural channels into every line of activity, into every field of endeavor, and affect with equal loss the laborer and the banker; the mechanic and the merchant; the man who advertises, as well as the man who does not advertise.

There is a way, a clear way and a straight way, for the United States to avoid the economic dangers of tomorrow. The loss of markets, which we can now foresee, may be counterbalanced by the creation of new markets. The future prosperity of the nation may be assured by seizing the present opportunity to create new and permanent markets for American goods in every quarter of the globe.

With the rest of the world sharing our domestic markets with us after the war, we must arrange to share foreign markets with the rest of the world. We must make ready now to put American products into Europe, Asia and South America, wherever the demand for our products exists or can be created.

To discuss the desirability of such a course is, I feel, academic. The big question is the possibility of accomplishing this result.

To doubt that it is possible is to doubt the initiative, the energy and the will of the American nation. There may be difficulties in the way, but they are not difficulties which America cannot surmount. The battle for world trade will be a battle between foreign producers who have been accustomed to paternal assistance from their governments and American producers, who have learned to stand upon their own legs and to win to the goal without fear and without favor.

The rest of the world is preparing for worldwide competition after the war. Pushed by the goad of stern necessity, the people and the government of every warring country are now maturing plans to recoup their fearful losses by entering into foreign trade as they did before. No one expects that they will be able to start the wheels going the moment peace is restored, but for self-preservation they cannot long delay in inaugurating some broad plan of world trade.

In England the various industries are beginning to organize for export under the stimulation of the British Board of Trade, which roughly corresponds with our own Department of Commerce. Practically every industry has been carefully investigated by committees appointed through the Board of Trade, and recommendations have been made as to the precise form in which each separate industry should combine for overseas trade.

FIREMAN'S FUND

Insures Hulls, Cargoes,

HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

G. KIRKHAM SMITH, Special Agent
407 LEWIS BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

Quite apart from this governmentally inspired organization is the proposed British Manufacturers Corporation, which has already been provisionally organized. This corporation is to consist of approximately one thousand manufacturers, banded together for the general benefit of British foreign trade. The subscription, or dues, in this corporation is to be \$1,000 a year, which will provide a fund of \$1,000,000 annually. The object of this corporation is to represent the British manufacturer through an agent in every principal city of the world. This agent is to transmit all manner of information to British manufacturers and co-operate, in his particular field, with the private agents of each British firm.

In addition to these two organizations is the British Trade Corporation, authorized by Royal Charter in 1917, with an authorized capital of \$50,000,000. Under the charter of this corporation, it is to act as agent for the government, or for any British banker, merchant or shipper. It is to carry on business on its own account. It is to finance undertakings of every description in developing

the trade of the British Empire in every part of the world. That this trade corporation is already fairly under way may be seen from the fact that it has made its first annual report, showing a gross profit of \$85,000.

Supplementing these organizations at home is the Empire Producers Association, which is an organization of the producers of raw materials throughout the British possessions. The purpose of this Empire Producers Association is to control the raw products of England's far-flung colonies, in order to give preferential supplies of raw materials to British industries in the period following the war.

So much for private British enterprise. The activity of the British government along the same lines is no less sweeping. The Board of Trade has been reorganized, with a particular eye to developing foreign commerce. The Department of Overseas Trade has been added to the government, which comprises the former Department of Commercial Intelligence of the Board of Trade, and the Foreign Trade Department of the Foreign Office. It has its own parliamentary secretary, and is headed by an official appointed jointly by the Board of Trade and the Secretary of State for Foreign Affairs.

The commercial attache, formerly attached to the Foreign Office, has been handed over to the new department and the number of and activities of these attaches has been increased. It has extended the Imperial Trade Commissioners service, established by Lloyd George while president of the Board of Trade. These trades commissioners represent the dominions and crown colonies in keeping England informed on openings for British trade.

In addition to the Department of Overseas Trade, a ministry of reconstruction has been established, one of whose chief functions is to have charge of commerce after the war. The minister now has in hand plans to reconvert 5000 British factories, at present making munitions, to direct a resumption of normal commerce and to centralize the activities of the entire government in hastening the resumption of British foreign trade.

From the fragmentary information available, it is apparent that Germany is already making desperate preparations to regain the place in world trade which she occupied before the war.

The cartels or trade associations through which Germany built up her foreign trade have been maintained.

The proposal has been made that all these asso-



A freighter taking the water at the yards of Pusey and Jones, Wilmington, Delaware.

INSURANCE COMPANY

Freights and Disbursements

STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Special Agent
220 BYRNE BUILDING
LOS ANGELES, CAL.

O. G. ORR & CO., Managers
ATLANTIC MARINE DEPARTMENT
37-43 WALL STREET NEW YORK

AND BRITISH COLUMBIA, 264 COLMAN BUILDING, SEATTLE, WASHINGTON

ciations for foreign trade shall be consolidated into one central foreign trade institution with branches in all export centers.

The German chemical industry has been more closely united than ever before, and the German steel syndicate has worked out plans for the consolidation of all the iron and steel industries of Germany.

In fact, Germany has gone so far along this line that protests have been heard in many quarters against the practical elimination of all individual effort.

More than one million tons of marine shipping have been booked by German shipbuilding concerns during the war. Subsidies are to be continued and the routing and loading of all German vessels are to be placed under the absolute control of the German government.

The Imperial Industry of Economics was created on April 1st, 1917, to bring together all Germany's social and economic problems under one head for what is known in Germany as the "transitional" period after the war.

From the evidence on hand, it is clear that Germany intends to restrict her import of practically everything but raw materials, pool her production and direct her entire energies to restoring her export trade.

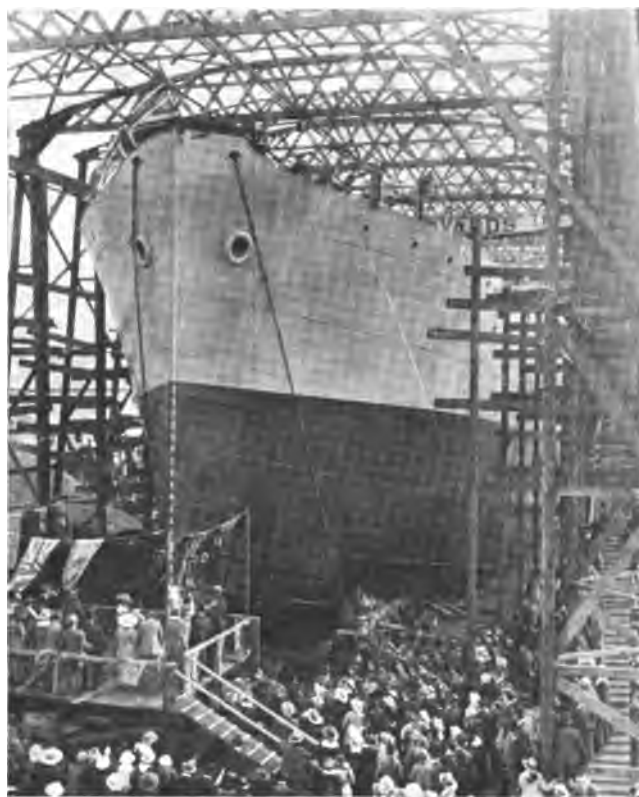
In seeking new markets for American goods we shall have an abundance of competition. But if we recognize the opportunity that now is ours, if we take advantage of the possibilities that now open before us, we can be in a position to defy this competition and to make America one of the foremost exporting countries of the world.

In the first place, we have the money to finance our foreign operations. Today we are the world's senior creditor nation. In the second place, we have, in the Federal Reserve Act, a credit machinery which gives the American manufacturer the means of competing upon equal terms with the manufacturer of any other country. Finally, for the first time since the iron ships of Great Britain drove the American clipper fleet from the seas, we now have in great measure, and will certainly have within a very short time, a merchant marine which can carry American products in American bottoms to the four corners of the globe. The rest is up to the American salesman, and with the equal opportunity that is now afforded him, and with proper organization behind him, the American salesman, as we know him, can walk away from any salesman in the world.

There is one other thought I would leave with you. To prosecute this war, we have built and are still building in Washington a great co-operative machinery. We have attempted to gather the best brains and initiative of the country for a common effort in winning the war.

When the war is over, the machine which has been constructed with so much labor should not be permitted to disappear. What will have proved a tremendous engine of war may well become a powerful instrument for the nation's peaceful progress. And I know no better use to which the nation may place the trained and co-ordinated instrument it now is shaping than to employ it in assisting in the development of the nation's export trade.

With private manufacturers and governmental agencies working in patriotic harmony, the way should be easy. Where the nation's prosperity is at stake there is room for the united service of every American.



On the opposite side of the continent, launching a big freighter in British Columbia.

Oriental Oils at Seattle

SEATTLE today possesses the largest vegetable oil terminal facilities in America, and the plants of the East Waterway Dock & Warehouse Company are being rapidly expanded to meet the requirements of the phenomenal increase in the importation of the oriental oils each month.

Today the East Waterway Dock & Warehouse Company possesses, or has in course of construction 32 storage tanks with a capacity of 7,000,000 gallons of oil. This company is a subsidiary company of Rogers Brown & Company, importers of oriental oils. The dock and warehouse are situated on Harbor Island, Seattle. The dimensions of the dock are 1,100 feet by 125 feet. Two warehouses 600 by 100 feet are in the process of construction, with a total capacity of 20,000 tons.

Immediately adjoining the property of the East Waterway Dock & Warehouse Company, Swift & Company have erected five steel storage tanks of 5,000 barrels capacity each, and other large eastern houses are considering the erection of tanks for the storage of their oil. In addition to the tank storage the company has space for 1,000,000 cases of 10 gallons each in open storage, and are now figuring on further warehouses.

The dock company is making a specialty of handling oil cargoes, either in bulk or packages. The company started construction February 20th, and within four months have taken delivery of over one-half of the oil which arrived on the Pacific Coast during the past year. The company now has facilities for loading 48 tank cars at one time and when their facilities are completed they will be able to discharge bulk steamers at the rate of 1,000 tons per hour. No other terminal in America, according to foreign trade experts, has ever come within striking distance of the record of the East Waterway Dock & Warehouse Company, of which Mr. C. Rogers Brown is president. The terminal is believed to be the greatest vegetable and bean oil terminal in the world. No one in the trans-Pacific trade has ever heard of any

other terminal of the kind that challenges comparison with it.

The dock company recently handled a 12,000-ton bulk shipment from the Orient, the first of the kind ever brought to the Coast. This shipment left Seattle in a series of trainloads, numbering an even dozen.

The vegetable and bean oils are imported for the manufacture of soap, also for edible and other purposes.

The East Waterway Dock & Warehouse Company was organized by Mr. C. Rogers Brown and associates last year. The site covers ten acres. The tremendous concentration of shipments at the present time at the Harbor Island terminal consist chiefly of soya bean oil, cocoanut oil, and peanut oil; also large shipments of rapeseed and more expensive oils.

There is also considerable oriental fish oil which is beginning to arrive at Seattle in increased quantities.

In handling bulk shipments brought in by tank carriers, the system installed by the Harbor Island terminal operates with a despatch and efficiency unequaled in any other port. The tank carrier ties up at the dock and there a powerful suction hose is run from the ship's tank to the mouth of an eight-inch pipe line more than 250 feet long. The pipe line empties into the tanks and also into additional pipe lines, which are built over railroad tracks, where the oil is poured into tank cars. The distribution of oil is controlled by valves. With this system the oil can be pumped from the steamship into both the storage tanks and the railroad tank cars at the same time. It can also be shut off from the cars and diverted wholly into the storage tanks, or vice versa. There are five different railroad tracks, with a capacity of forty-eight tank cars. The oil can be shut off from any storage tank or from any car. The system can confine the flow of oil to one car, or can turn the oil into all of the storage tanks and all the tank cars simultaneously. This system was designed



Millions of gallons of vegetable oils stored on Seattle's wharves illustrated the necessity for special terminals for handling this important Oriental product.

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A tank steamer unloading her vegetable oil cargo at the plant of Rogers, Brown and Company, Seattle.

by Mr. James F. Brown, consulting engineer, and installed under Mr. Brown's direction.

The oriental oil movement is receiving a vigorous impetus and Rogers Brown & Company have taken an active part in its importation. Mr. Geo. B. Green, formerly connected with the port com-

mission, is general manager of the dock company.

The prominence of the East Waterway Dock & Warehouse Company has placed Seattle in a position which has excited favorable comment and attention not only in this country, but throughout the Orient.

Import and Export Trade Notes

OLIVER J. OLSON & COMPANY, recently received advices of the loss of the schooner "Annie Larsen" in the South Seas, having been wrecked on Malden Island. This firm is now agent for the steamers "Westerner" and "Florence Olson". The "Virginia Olson", recently sold to the French government, has been twice torpedoed in French waters, but is still in active service, a splendid testimonial to the qualities of the Western-built wooden ship.

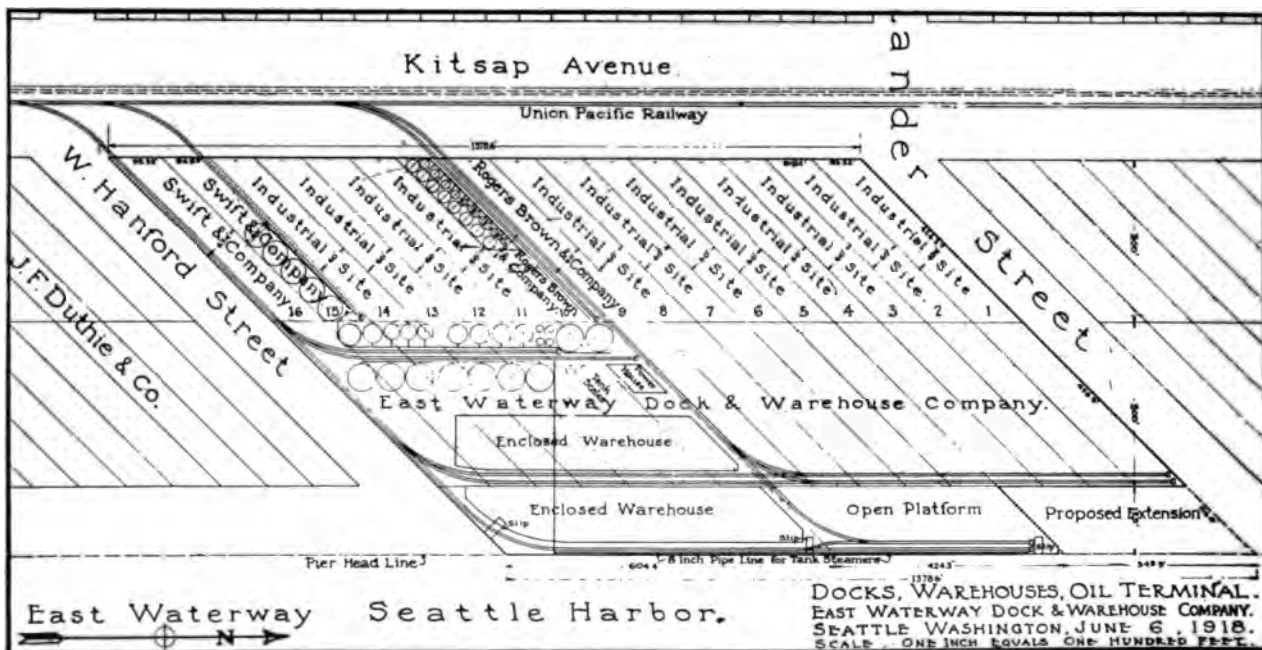
Within the last month several sailers arrived at San Francisco, bringing grain from Australia, and found plenty of freight for the return voyage. These, together with the ships sent by the government, have aided very materially in clearing up a large part of the freight which has accumulated in this port, for Australia.

The government has established a rate of \$32.50

per ton on these sailers, under control of the United States Shipping Board. Steamer space for Australia and New Zealand continues to be booked far in advance.

Space for Singapore, Shanghai and Hongkong is still exceedingly hard to obtain, and booked well in advance. The rate remains the same as last quoted. The addition of the Matson steamers, "Maona" and "Lurline", on the run to Manila, will aid greatly in reducing the large quantities of accumulated freight for that port. The government has made a rate of \$25.00 per ton to Manila on all steamers under control of the Shipping Board.

Due to the subsidence of the submarine menace on the East Coast, insurance rates have eased off to some extent on vessels bound for the West Indies and South America. Rates for the west coast of South America are now quoted at 2 per cent



Docks, warehouses and oil terminal of the East Waterway Dock and Warehouse Company, Seattle.

for neutrals and $1\frac{1}{2}$ per cent for armed belligerents, a reduction of about $\frac{1}{2}$ per cent in each case.

For the East Coast, a similar reduction has been made for outward and inward voyages, quotations being 2 per cent for neutrals and 1 per cent for belligerents to Brazil, while outward rates to the River Platte are 2 per cent and $1\frac{1}{2}$ per cent for neutrals and belligerents respectively. For the West Indies and the north coast of South America, prevailing rates are $1\frac{1}{2}$ per cent and 1 per cent. Trans-Atlantic rates, however, remain unchanged, those to the United Kingdom and Havre being 4 per cent for neutrals and $2\frac{1}{4}$ per cent for armed belligerents.

The Pacific war risk rates are, for Australia, $\frac{1}{4}$ per cent; Orient, not beyond Hongkong, 1-5 per cent; beyond Hongkong but not beyond Bombay, $\frac{1}{4}$ per cent. The marine rates are about as follows, on first-class steamers: Australia, $\frac{1}{2}$ to $\frac{7}{8}$ per cent; Japan, 40 cents; China, $\frac{1}{2}$ per cent; India, $\frac{3}{4}$ per cent, and Dutch Indies or Straits Settlements are 65 cents.

Hereafter no licenses for the importation of broken cocoanut meat which is shredded, desiccated or prepared (otherwise known as Ceylon Copra), will be issued except for ocean shipment on or before June 30, 1918.

Licenses for the importation of a limited amount of copra (cocoanut meat broken, not shredded, desiccated or prepared), will be issued for shipment after June 30, 1918, from Australasia, the East Indies, the West Indies, Central America and Mexico.

The amount of copra permitted to be licensed will be allocated by the Bureau of Imports in accordance with suggestions made by the United States Food Administration.

LABOR COMPETITION DISAPPROVED

The War Industries Board has adopted the following resolution:

"First, that the practice of manufacturers using competitive peace-time methods in the procurement of labor, resulting in the withdrawal of labor from war industries, is strongly disapproved, and henceforth this Board, through its Priorities Division, will in proper cases withhold priority assistance from employers who persist in pursuing such methods."

Underlying Principles:

(a) That, in time of war, all the labor resources of the country should constitute a common supply for the benefit of all industries connected with the war.

(b) That all industries not directly connected with the conduct of the war should contribute their equitable share of the labor which is needed by war industries, so that such work may at all times be fully manned.

(c) An equitable distribution of the contributions required from non-war industries for war work, and a proper distribution of available supplies of labor among the war industries, according to their relative needs, can be secured only when conducted by a central agency. Such an agency, as stated by the President, must "have sole direction of all recruiting of civilian workers in war work," and further, in "taking over this great responsibility, must at the same time have power to assure to essential industry an adequate supply of labor, even to the extent of withdrawing workers from non-essential production."

(d) That recruiting of labor for war work should be so conducted as not to take men away from employers doing war work, from the railroads or farms.

(e) That the central agency must have accurate information as to the total demands for labor in all war industries and the location and character of such demands.

(f) That a concerted national effort should be made to secure all the men needed for war work, at whatever cost.

(g) That movements of labor should be made from places as near as possible to the demand.

(h) That competitive increases in wages should be prevented and the rates of wages in war work stabilized so far as possible.

Scope of the New Plan

The program will be expanded to cover recruiting skilled labor, of which the supply is less than the demand, and "hiring at the gate" when and where the Employment Service shall have sufficient branch offices to maintain this work; but it will apply to non-war only in case competitive recruiting by employers in such work proves injurious to war industries. In the meantime employers are permitted to do their own recruiting of skilled labor except as forbidden by the following restrictions, which apply to employers engaged in non-war work as well as war industries:

(a) No solicitation in any way, direct or indirect, by advertising superior inducements or otherwise, of men already employed in other war work.

(b) No advertising should be done except with the authorization of the local representative of the United States Employment Service.

(c) Not to advance, pay or arrange for interstate transportation of labor, except through the agency or with the consent of the United States Employment Service.

Restrictions on Employers

Employers not engaged in war work are not permitted to take labor from the Government or employers engaged in war work. The central recruiting program does not yet apply to women workers, nor to those engaged in war work if their maximum force is less than 100 men.

Employers are not restricted in their choice of the men recruited for them by the United States Employment Service. They can exercise choice either at the plant when the men are sent there or preferably by arrangements with the State director at the office where labor is recruited.

WANTED—Men and Women Sales Agents everywhere, to sell on commission to wholesalers, retailers and consumers **Horst's** perfected process **Dried California Vegetables**. No waste or work in preparation. Everybody buys and repeats orders. Wonderful opportunity for live sales agents. Address, E. Clemens Horst Co., Dept. B, San Francisco.

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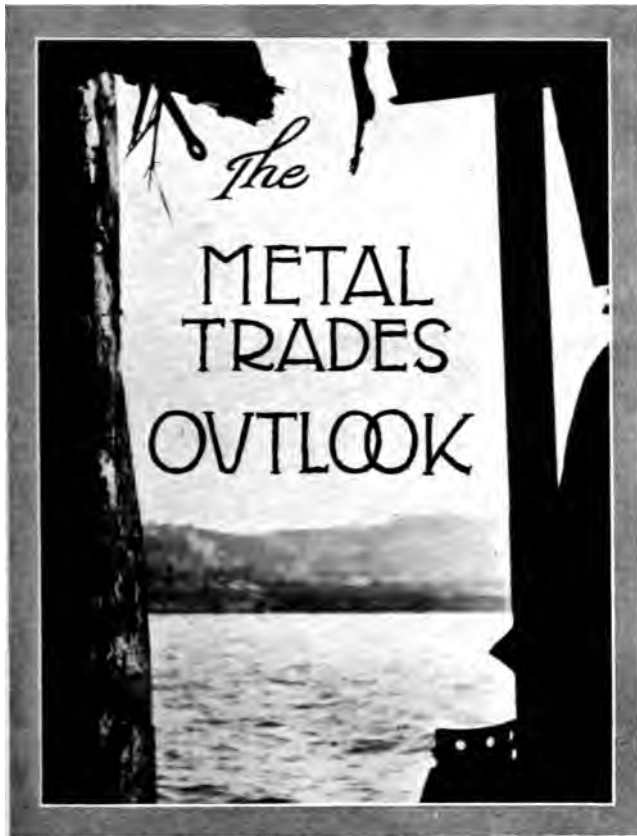
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**Howard W. Bray****Iron Pipe—Steel Rail—Galvanized Sheets**

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THE total amount of war steel now ordered by the government and undelivered, or about ready for ordering, is in the neighborhood of 20,000,000 net tons. Most of this material is required for early delivery. The tonnage of course refers only to the certificates and priorities, not to the preference list recently established, and that list will involve a very large tonnage.

Pig Iron: Shipments of surplus pig iron, if there are any, must have the written approval of the War Industries Board. A general survey of the pig iron trade is now under way and after this is completed officials will be in a position to state approximately what will be required for war needs. Inquiry is heavy, but sales are few.

Plates: Practically the only export business placed during the past month has been the allotment for the Japanese government in return for its ships. Under the new ruling the government has commandeered almost the entire output of plates.

Billets: The demand for billets continues, but, as in the balance of the iron and steel market, the only sales are for government work.

Bars: Bar iron is not included in the War Industries Board's resolution, but the mills are having extreme difficulty in making shipments for other than government work because of the necessity of obtaining railroad permits.

Structural Shapes: All the fabricating shops are busy with government orders, especially for the shipyards. Any lots which are offered occasionally are immediately sold.

Galvanized and Black Sheets: We have nothing new to report except that the output of the sheet

mills is being restricted, to some extent, by the shortage of sheet bars. It is rumored that the government is contemplating placing some large black and corrugated sheet orders. The mills are absolutely refusing to take orders unless by priority certificates.

Brass and Copper Tubing: Most of the producers are considerably behind in their deliveries of brass and copper, which naturally holds up manufacturers of tubing. At the same time the demand for brass and copper products continues. All quotations made by the factories are with the understanding that the government price will apply at time of shipment.

Steel Boiler Tubes: The mills are sold up for months in advance, practically all of the orders being for government work, and there is a great shortage in the supply of seamless steel tubing. One of the leading mills is said to have a good part of its next year's output already under government contract.

Wire Rope: Wire rope also comes under the new ruling made by the War Industries Board, and no new orders will be taken on unless for government work.

Steel Rails: Quite a number of the rail mills are devoting their entire resources to the production of shell bars, and those which are rolling rails are heavily booked.

Bolts and Nuts: The shortage in the supply of steel and labor is restricting the output of bolts and nuts to a large extent. The demand is very heavy, especially for government work. Up to the present time, however, no government priority certificates are necessary.

Steel manufacturers throughout the United States have been instructed by the government to furnish no more steel to any consumer except where it can be shown that it is to be used under one of the following classifications:

1. United States Government Orders.
2. Railroad Business.
3. Coal Mining Business.
4. Steel Manufacturing Business.
5. Manufacturers of Food Products.

A resolution provides for weekly reports stating whether the products shipped during the week were for war or commercial account. For some weeks past these reports have been requested on pig iron and steel plates, on which the shortage is most acute.

Manufacturers of tubing are obliged to make bi-monthly statements showing for which of the following classes the tubes were furnished:

1. Emergency Fleet Corporation.
2. Navy Department.
3. War Department.
4. Allied Governments.
5. Other Government Work.

It is quite apparent that there will not be very much iron and steel on the open market for some time to come.

Stationary—ENGINES—Marine 50 H.P.-500 H.P. FUEL OIL, DISTILLATE, GAS, KEROSENE For Quick Delivery A. H. COX & CO., Inc.	
SEATTLE	WASH.

Engineers, Shipbuilders and Others

ONE of the recent appointments to a high position in the shipbuilding field that has aroused a great deal of gratification among marine engineers is the selection of Mr. Luther D. Lovekin as a vice-president of the American International Shipbuilding Corporation at Hog Island, Philadelphia. Mr. Lovekin is a marine engineer of the highest repute, as well as the originator of several widely used machines and improvements in steam generating plants and engines. His first prominent connection with shipbuilding interests occurred some eighteen years ago, when he became chief draughtsman of the William Cramp & Son Ship & Engine Building Company of Philadelphia. Mr. Lovekin then joined the newly formed New York Shipbuilding Company of Camden, New Jersey, as chief engineer. About one year ago Mr. Lovekin was appointed to the position of consulting engineer of the American International Shipbuilding Corporation, and it was from this position that he was advanced to a vice-presidency of the concern.

Bert C. Ball, president of the Williamette Iron & Steel Works, who was in the East for a few weeks, spending part of his time at Philadelphia, where an agency has been established, in charge of Harry Humphreys, former manager of the boiler department, has returned.

Emergency Fleet Corporation officials of Seattle who were in the city during the month included Captain John F. Blain, supervisor of steel construction in the Northwest; Captain W. A. Magee, in charge of wooden construction in the State of Washington; D. M. Callis, assistant to Captain Blain, and E. B. Egbert, traveling inspector.

After having inspected turbine engine plants in the East, in company with representatives of other districts, Fred B. Pape, assistant supervisor of steel construction in the Northwest, headquarters at Portland, has returned. In his absence Henry Cave, formerly marine superintendent for the North Pacific Steamship Company, was in charge of the work.

Joseph Supple, pioneer boatbuilder and senior member of the Supple-Ballin Shipbuilding Corporation until his retirement several weeks ago, when he disposed of his stock to George C. W. Low of New York, and Daniel Martin, president of the Hesse-Martin Iron Works, is back after an automobile tour through Northern California.

During part of July, H. T. Whigham of London, European representative of the United States Steel Corporation, was in Portland. He is on a vacation after having spent several years on the other side of the Atlantic.

Arthur A. Isbell, whose photograph is reproduced herewith, has just taken over the duties of division superintendent for the Marconi Wireless Telegraph Company of America, succeeding Mr. George S. DeSousa, who goes to the executive offices of the company in New York.

While Mr. Isbell comes here from the New York headquarters of the Marconi, he needs no introduction to the Pacific Coast, as he spent eleven years in the wireless service along the Pacific. He first came out as operator on the steamer "President", the first wireless ship, making the trip to accept the managership of the old Massie Wireless

Telegraph Company. Mr. Isbell recently spent fourteen months doing special radio work at Washington for the Bureau of Steam Engineering, U. S. Navy.

Mr. Isbell's return to the Pacific Coast enables him to resume pleasant and close relations with a great number of men in shipping circles from Seattle to San Diego whom he counts as his friends.



Arthur A. Isbell, new Division Superintendent for the Marconi Wireless Telegraph Company of America.

Several changes in rank and official duties of the officers in the local offices of the United States Shipping Board went into effect a few days ago.

A. J. Frey, formerly district supervisor, is designated assistant district manager.

Robert L. Hague, formerly of the engineering department of the Standard Oil Company, is appointed and designated assistant in charge of steel ship construction.

T. L. Tomlinson, formerly district supervisor, is designated assistant in charge of wood ship construction.

R. J. Chapman, formerly assistant district supervisor, becomes assistant to the assistant in charge of wood ship construction.

A general order from Charles Piez, vice-president of the board, has been received defining the powers and jurisdiction of the district which has been enlarged to include supervision of concrete ships projected by the San Francisco Shipbuilding Company and the Scofield Engineering Company of San Diego. The order gives District Manager Pillsbury jurisdiction and supervision over all shipyards and plants in the district holding Emergency Fleet Corporation contracts. He is given discretionary authority in matters relating to the continuance or cessation of work.



Convention of Leading Hoist Manufacturers

THE Electric Hoist Manufacturers Association held its June meeting at Montour Falls, New York, where the members of the association were the guests of the Shepard Electric Crane & Hoist Company. Twenty-two members were present, representing the following eight companies:

The Brown Hoisting Machinery Co., Cleveland, Ohio.

The Detroit Hoist & Machine Co., Detroit, Mich.

The Euclid Crane & Hoist Co., Euclid, Ohio.

The Link Belt Co., Nicetown, Pa.

The Roeper Crane & Hoist Works, Reading, Pa.

The Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.

The Sprague Electric Works, New York City.

The Yale & Towne Manufacturing Co., New York City.

The general topic of the meeting was war service and the general discussion was directed along the lines for co-ordinating the experience and facilities of the electric hoist manufacturers to be of the most direct and efficient service to the government for war requirements. The electric hoist manufacturers are heavily booked up on government orders for war purposes and the problem of securing raw material sufficiently in advance to properly meet government requirements has become a critical one. The consensus of opinion of the electric hoist manufacturers is that the government orders for war purposes should take precedence over all other orders, and if war requirements call

for the complete output of all of the manufacturers of electric hoists, it will be desirable to refuse all other business.

The most instructing and interesting event of the meeting was a detailed inspection of the plant of the Shepard Electric Crane & Hoist Co., covering design, manufacturing, shop costs, testing, technical history of installations and welfare work.

The visiting members of the Association were delightfully surprised by the program of entertainment which had been prepared by the Shepard Electric Crane & Hoist Co., to take place after the regular business meeting. The program consisted of luncheon at Glen Springs in Watkins, automobile trips to Ithaca and dinner at the new Ithaca Hotel, followed the next morning by an automobile trip from Watkins to Keuka Park via Tyrone, Keuka Landing and Penn-Yan, with a noon fish dinner at Alleys Inn, Keuka Park. At 1:30 p. m. the party left in automobiles for Dresden, Geneva and Valois, arriving at the latter place on Seneca Lake at 4 p. m., where preparations had been made for the party to enjoy trout fishing and motor boating. At 7:30 p. m. the guests sat down to a chicken dinner at the Sagowatha Inn. At 9:30 p. m. the party left in automobiles for Montour Falls after enjoying for a day and a half the most charming hospitality of the Shepard Electric Crane & Hoist Co.

The visiting members were tremendously impressed by the frank and open manner in which the officials of the Shepard Electric Crane

& Hoist Co. opened their entire plant to the visiting competitors. This experience is unparalleled in the history of electric hoist manufacturers.

A distinct loss was felt by the members in that the secretary-treasurer, Mr. R. T. Turner, could not have been present, as he had been suddenly called to the colors of his country.

HOT DIP GALVANIZING IN SEATTLE

The Pacific Metal & Galvanizing Company of Seattle was started to meet the demand for hot dip galvanizing, created by the shipbuilding program of the allies and neutral countries.

Originally, the plant, located at 2-4-6-8 Hanford street, Seattle, was a single kettle one—sufficiently large, however, to meet all the demands then placed upon it.

The entrance of our Government into the great world war, with the quickly following increase of the shipbuilding program, produced an enormous additional demand upon all industry allied or subsidiary to the building of ships.

Realizing the importance of preparedness, the Pacific Metal & Galvanizing Company enlarged their plant by adding a second complete hot dip galvanizing equipment, which was almost immediately followed by a third.

Best Steel Casting Company

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STEEL CASTINGS

BEST Castings
Are Clean, Sound and
True to Pattern.

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WORKS: OAKLAND, CALIFORNIA

Converter Process
Castings Up to
5,000 Lbs. Each.



The plant of the Pacific Metal and Galvanizing Company, a busy Seattle concern

Our illustrations give an idea of the size of the plant and of the work galvanized; a visit shows a large, well-lighted, well-ventilated building—an equipment that is modern and replete with labor-saving devices—carloads of bars, drift bolts, spikes, clinch rings are handled easily; miscellaneous forgings, castings, etc., are loaded on boats, and all work conveyed into pickling tanks by overhead cranes, through the galvanizing kettles by monorails and thence on other cranes and conveyors to cars or trucks, as desired.

The visitor sees pipes, with every variety of bends, galvanized; castings galvanized as smoothly as lathe work and bright as new silver; nails and brads, wood screws, with slots and threads, as smooth as when they came from the screw machine; threaded work (bolts and nuts), threaded cast iron flanges, and threaded pipe

galvanized so that the threads retain their symmetry.

A specialty of this plant is the galvanizing of iron and steel castings, and of brads, nails, screws, etc., bringing to this class of work a perfection long demanded by the trade, but hitherto not furnished by any hot dip galvanizing plant on the coast.

Though today the Pacific Metal & Galvanizing Company has the largest hot dip galvanizing plant on the Pacific Coast, they are preparing a further expansion to meet whatever demands the shipbuilding industry of the Northwest may make upon them. Their past indicates their ability; their sincerity and earnestness create a feeling of security that their future will be one of expansion; greater service, adequate service, the best of service, to those who would be served.

Exhaust Type of Ship Ventilators

WE are presenting cuts of the Keane Patent Exhaust Ship Ventilator, which has recently been approved by the U. S. Shipping Board in Washington, and is now being installed on the Hough type vessels now building for the Emergency Fleet Corporation by the Kruse & Banks Shipbuilding Co. at North Bend, Oregon.

The owners of this patent, E. M. and Eugene H. Simpson, of San Francisco, have had tests of their ventilator made at the Aerodynamic Laboratory of Stanford University, which have demonstrated that whether the wind strikes the "Keane" either square or at an angle, the drawing power is the same, which cannot be said of a cowl or any other ventilator now on the market.

The actual test on a 14 inch ventilator with a 25 mile wind striking it at an angle of 45 showed an exhaust of 736 cubic feet per minute, or 44,160 cubic feet per hour. In other words, 1-14 inch Keane ventilator would change the air in an empty hold 55 feet by 40 feet by 20 feet, once every hour; but, of course, we cannot always figure on having a 25 mile breeze, but taking 10 miles as an average, the same ventilator

will exhaust 18,000 cubic feet per hour.

The construction of the Keane ventilator (which is stationary) is extremely simple, and its powerful exhaust is caused by the wind rushing by the deflector plates, thus causing

a partial vacuum in the body of the vent, which is immediately filled by the air or gases rushing up from the hold or other space to be ventilated.

The French Government is equipping the 20 vessels now building by the Foundation Co. of New York at Portland with Keane ventilators, recognizing the fact that they have secured a perfect uptake ventilator.

From the many testimonials at hand from ship owners, masters and marine surveyors and engineers, the Keane has evidently proved its worth on hundreds of vessels, especially those in the sugar, coal, copra and lumber trade, as it absolutely prevents sweating of sugar and foodstuffs or heating of coal and copra cargoes, thus doing away with the one big dread—fire from spontaneous combustion.

For case oil cargoes, when there is always a leakage, the Keane will not only carry away the gases, but can be made proof against any back firing by covering the outlets with a 60 mesh brass wire screen. This, of course, would reduce the efficiency of the ventilator to a certain degree, which can be overcome by increasing the sizes used.

In every respect, the Keane is fool-proof, as it is impossible to accidentally drop lighted cigars or matches down into the hold as one might easily do with a cowl.

Although the old Keane ventilator has been in use for the past sixteen years, it has never had an equal, and the new improved Keane, on which patents are now pending, is rapidly gaining in favor with the ship owners, since the recent activities in building, and it bids fair to known in every port where an American bottom goes.

All captains and owners who have ever sailed with a Keane are loud in their praises of its efficiency, and the good, clean conditions their cargoes invariably came out in, claiming this make of ventilator more than pays for itself on each trip.

BUSINESS PERSONAL

W. H. Callan, general manager of plants, and W. P. Pressinger, general manager of sales, have been elected vice-presidents of the Chicago Pneumatic Tool Company.



A group of Keane Patent Exhaust Ship Ventilators made for the steamer "North Bend."



Galvanizing pipe at the plant of the Pacific Metal and Galvanizing Company, Seattle.

The list of publications put out by the Fireman's Fund Insurance Company for the benefit of its agents and the insuring public is unusually comprehensive and consists of the following: Fireman's Fund Record, a magazine for the company's agents; Automobile Tour Book of California; Fireman's Fund 1918 Register of Vessels; Tractor Rate Folder; Annual Calendar; folder containing rules and regulations governing the entrance of automobiles and motorcycles into the Yosemite; and an "Army and Navy Insignia" folder.

WHITE BROS.' BULLETIN NUMBER TEN

In this bulletin we are taking the liberty to quote from an editorial of the "Hardwood Record" of Chicago, under date of June 25th, 1918. This editorial describes the condition of the hardwood market as brought out at the convention of the National Hardwood Lumber Association held at the Congress Hotel, Chicago, June 21st and 22nd:

"As it is today, the unanimous pronouncement is that hardwood lumber is sold up, that prices are governed merely by ability to furnish stock, that there is not the slightest chance of production over-topping demand. The situation might be best described by the statement that very few hard-

wood men today would be willing to sell stock that they did not have actually bought. The significance of this description lies in the fact that prices climb so rapidly that it would not be safe to sell at a certain figure without knowing definitely that the material sold could be purchased at a figure leaving room for a reasonable profit. It is so difficult to locate any quantities of salable material in ad-

most any line that in the length of time necessary to locate stock with which to cover an order, it is likely that the price would have climbed to such an extent that the delivery would be made at an actual loss."

These are the conditions in the East today; prices have jumped out of sight in certain lines; quartered oak is more scarce than it has ever been in the history of the business, and a rise in the retail price on the Pacific Coast of five or six cents a foot is imminent. Plain oak, ash and poplar are also due for a very decided advance, and that very shortly. The two raises in freight rates, within the last several months, have placed an additional burden on the cost of hardwood to Pacific Coast consumers.

Owing to the scarcity of dry stocks and the unsteadiness of prices, it is advisable for all users to take advantage immediately of any material they can locate.

The truly wonderful achievements of our government in the prosecution of the war, in the way of getting our boys over, building ships, airplanes and munitions, have shown the world what Uncle Sam can do when he gets into his stride. The United States is the greatest nation in the world, industrially and energetically, and we are marching rapidly on to complete victory.



A shipment of Loeb ship knees arriving at the Supple-Ballin Shipbuilding plant, Portland.

BRASS
SHEETS—RODS—WIRE
SEAMLESS COPPER AND BRASS TUBES
HEXAGON NAVAL BRASS NUTS
F. J. KLENCK COMPANY
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Plant of the Peninsula Iron Works which is turning out a large amount of marine work.

LLOYD'S REGISTER OF AMERICAN YACHTS, 1918

Conditions in England at the beginning of 1915, after six months of the great war, left no ground for question as to the necessity for the suspension of Lloyd's Register of British and Continental Yachts; and after continuous publication for 38 years the work was discontinued for the duration of the war. When the same question arose last fall in relation to the Register of American and Canadian Yachts, the answer was not so obvious, and after serious consideration of the condition of American yachting at the end of last season, and of the war outlook, it was decided to issue the Register as usual in 1918. Whether this was a wise decision from a financial standpoint for the publishers depends now upon American yachtsmen and the yacht clubs, but in any event yachting is the gainer in the very complete record which was sent out last month.

The new Register of American Yachts is identical with its predecessors in all respects except in the omission of the plates of flags, making a somewhat thinner volume. The printing of the flag plates, usually some 600 club burgees and the private signals of some 2,000 yachtsmen, is, under the most favorable conditions, one of the serious problems connected with the production of a yacht register. The one process by which satisfactory results can be obtained is that of lithography—printing from stone—a separate stone be-

ing necessary for each color. In the case of the Yacht Register, seven sets of stones are used, and every flag must be re-drawn on stone each year. The process is not only slow, necessitating the commencement of



The Peninsula Iron Works is doing a large amount of line and tail shaft turning for the shipyards in the Portland district.

the work early in the year, but very expensive, even in ordinary times; the cost of such work today makes it out of the question without an increase of price, which is in itself

highly undesirable in the present state of yachting.

The compilation of the book has been a matter of exceptional difficulty this year; many yachts are under Government ownership or control, and it is not permissible to publish definite information concerning them. A large number of yachts have been sold for commercial purposes, their new owners having no interest whatever in yachting and taking no trouble to answer inquiries concerning them. Many yachtsmen, both individual owners and club officers, are in active service, and inquiries have failed to reach them, or there has been no opportunity for a reply. The new book, however, contains the particulars of 3,490 yachts, only 136 less than last year, though building has practically stopped. The usual complete particulars are given, including much information as to new engines, but in some cases it has been necessary to omit the names of owners. The list of clubs and associations includes 556 organizations, only 27 less than last year.

There is the usual list of the owners of all the yachts, with clubs, addresses, etc.; a list of former names of yachts and a list of signal letters. The Trade Directory section has been thoroughly revised and offers a complete guide of all manufacturers and dealers concerned in the production of yachts and yacht supplies, from the largest steam yacht down to a spark plug. The book is published by Lloyd's Register of Shipping, 17 Battery Place, New York, the prices being \$8.50 for the blue cloth edition and \$7.00 for the plain canvas.

AIDING THE SHIPBUILDER

The shipyards in the Portland district are being backed up in their efforts towards record production by the good work being done by many foundries and machine shops throughout the Northwest, and among these is the plant of the Peninsula Iron Works at Portland. This concern entered the foundry and machine shop field some nine years ago and met the great demand for marine work by



Pouring the condenser casting for a Ferris type ship at the Peninsula Iron Works' iron foundry.

Cleveland

AIR TOOLS

NEW CLEVELAND POCKET - IN - HEAD RIVETING HAMMER MOST POWERFUL RIVETER MADE

Let us prove it in your shop

The New Cleveland is Shorter, Hits Harder, Runs Faster, Uses Less Air and Has Less Recoil in Operation Than Any Other Riveting Hammer on the Market.



CLEVELAND
CHIPPING
HAMMERS



VERY SPEEDY
AND
DUST-PROOF



One piece Drop-Forged Thumb Latch

Latch is provided with two pins which prevents the shifting of latch from its proper position insuring the full opening of throttle valve at all times.

Drop-forged handle attached to cylinder by a secure Locking device leaving the handle free from exterior Lugs, Bolts and Nuts.

Pocket-in-Head is an exclusive "Cleveland Feature" not found in any other make of riveting hammer. The increased efficiency gained by compounded air stored in Pocket-in-Head and suddenly released on the piston gives a greater driving capacity to each size hammer, insuring absolutely tight Rivets in all classes of Work.

No Exhaust Ports

Pistons of different lengths may be used without detriment to the Tubular Valve through which the piston passes. The short piston has the same uncushioned blow at the striking end as the standard length piston.

The Heart of a Pneumatic Tool is the Main Valve upon the steady and precise action of which depends the successful operation of the hammer. The Cleveland Tubular Valve is actuated by live air in both directions insuring a uniform supply of air at each stroke of the piston; The Cleveland Tubular Valve is short, light in weight, has solid walls free from portholes from which breakage develops, and has unusually large bearing surfaces. Cleveland construction overcomes Valve breakage.

CLECO "Y" HOSE FITTINGS

Cleco "Y" Fittings are made in two types—"With Air Seated Shut-off Valve," and "Without Valve"—each type is made with Male or Female Outlets and Inlets and all types interchange with Bowes Couplings in sizes 1/4-in. to 3/4-in., inclusive. Especially adapted for Ship Yards.

BOWES AIR HOSE COUPLINGS

OVER 1,500,000 IN GENERAL USE

The Bowes is instantly connected or disconnected and air tight in all pressures.



The Bowes is interchangeable in sizes 1/4-inch to 3/4-inch inclusive.

Cut Shows Cleco Never Slip Clamps Attached to Bowes



CLECO AIR SEATED VALVES

The Cleco Valve is made in two styles as illustrated. The Style P. O. is made in sizes 1 1/4-in. Pipe Thread Inlet and 1-in. Pipe Thread Outlet; 1-in. Pipe Thread Inlet and 3/4-in. Pipe Thread Outlet; 3/4-in. Pipe Thread Inlet and 1/2-in. Pipe Thread Outlet. The style F. O. is made with 1-in. Pipe Thread Inlet and Female Bowes Coupling Outlet.



THE CLEVELAND PNEUMATIC TOOL COMPANY

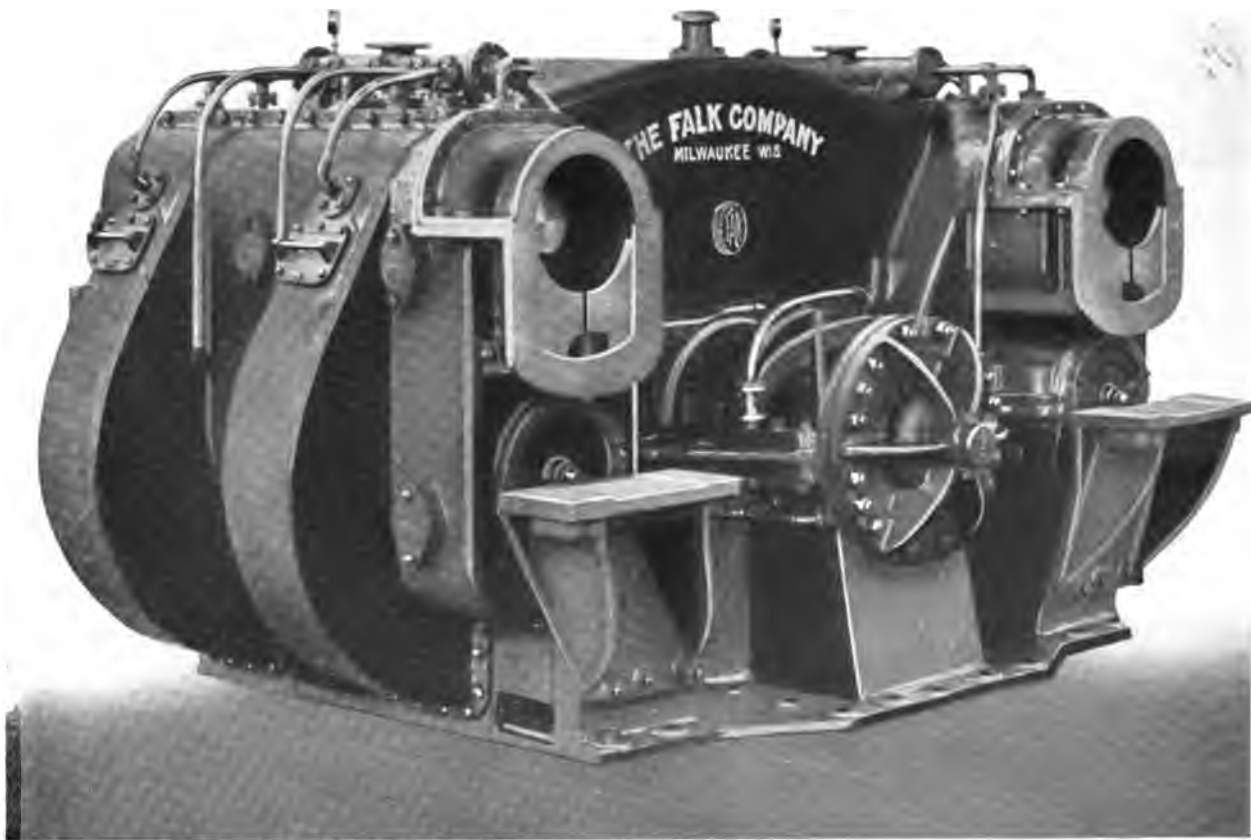
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PLEASE MENTION THE PACIFIC MARINE REVIEW WHEN YOU WRITE



Forward end of double reduction marine gear for Compound Turbines,
2,800 S. H. P., 3,600 to 90 R. P. M. including Kingsbury Thrust Bearings.

ORGANIZED ESPECIALLY FOR MARINE WORK

We have provided and have in operation a large number of very powerful, SPECIAL precision machines for producing HIGH SPEED GEARS and gear cases FOR MARINE WORK.



End View with Cover Removed

Our exceptional facilities for handling Marine work have enabled us to produce gears for this field aggregating more than 600,000 H. P. and we are now working on contracts amounting to over 2½ MILLION H. P.

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expanding their plant and adding to its equipment.

Situated adjacent to the Grant Smith-Porter Shipbuilding Company, the Peninsula Iron Works has been performing a great deal of work for that concern and has aided materially in the fine delivery records made at that plant. At the present time about 95 per cent of the work turned out is for marine purposes, the firm specializing in gray iron castings, cast iron condenser shells, and in their machine department turning out auxiliary deck machinery and main engines.

At present the Peninsula Iron Works is turning out from twelve to fifteen tons of finished castings per day and are contemplating further enlargements to meet the growing demand.

Those responsible for the splendid showing made in the past few years by this establishment are Mr. W. A. Bennett, president; Mr. A. Larowe, secretary and treasurer; Mr. L. A. Campbell, at the head of the foundry department, and Mr. M. R. Morron, plant superintendent.

BIG STEEL BARGES

On July Fourth part of the patriotic celebration of the Dravo Contracting Company, engineering works department, was the launching at their Neville Island yard of a 600-ton steel barge.

To comply with President Wilson's request, that as many launchings as possible be made on the Fourth, work was forced ahead until it was insured that this boat would be the "Beat the Kaiser" contribution of the Dravo Company for the national showing on that day.



Launch of a large steel barge at the Neville Island plant of the Dravo Contracting Company.

However, this is the third steel barge to be launched at this yard during the past three weeks.

Immediately after the launching, the keel was laid for a stern wheel tow boat (Warren Elsie) and another record broken. It was just seven minutes and forty seconds from the start until the keel was laid. This record was due to storage yard efficiency, enhanced by the speedy use of Dravo whirlers (machines designed, built and standardized by Dravo engineers for their own construction work, and now sold commercially).

This company is building one more 600-ton barge and three additional tow boats similar to the Warren Elsie, started July Fourth.

Within a week or two, on an order for seven, maneuvers boats for the United States Government will be launched for operation on the Ohio River.

The barges built by the Dravo Contracting Company, engineering works department, are of the sealed air compartment type, with cargo decks above the water line. The design has proved its superior efficiency in river work because of its added buoyancy and eliminated danger to cargo from small leaks in hull.

The plant covers an area of an acre and has excellent shipping facilities, having both rail and water connections.

Industrial Engineer

With successful record in plant lay-out, reorganization and administration problems in a wide range of large industrial plants completing service for Emergency Fleet Corporation in connection with standardizing shipyard construction methods.

Available for consulting service for Coast shipways and shops on management and production problems. Competent and practical service of this nature especially valuable to executives burdened with details of operating routine.

Write or wire "ENGINEER"

Care PACIFIC MARINE REVIEW, San Francisco.

Westinghouse Brings Out Small Turbo-Generator Unit



A small turbo-generator set complete.

TODAY it is the duty of everyone to do his utmost in winning the war, and therefore no stone should be left unturned in obtaining a greater production with the same number of men, or the same production with fewer men; and no waste in material, time, nor money should be permitted. To aid in furthering work in many lines, the Westinghouse Electric & Manufacturing Company has recently produced a small turbo-generator unit for direct current service. This unit is designed for ten kilowatts output, although a temporary load of approximately 12.5 kw. may be obtained. A smaller unit of 8.5 kw. gives a range of capacity suitable not only for lighting work, but also for the majority of electro-magnet work.

Its range of capacity, its range of operating conditions and its construction make this an admirable unit for many uses. Among some of the fields of service for which it is adaptable, some of the more prominent are surface mining, where flood lighting for night work has come into such general use. Its range of operating conditions (80 to 235 lbs. inlet, and from zero to ten pounds back pressure) make this a suitable unit to install in oil refineries where it can be used as a reducing valve between sufficient light for his plant as a "by-product" in his oil refinery.

Since the energy developed is direct current, it is finding great favor on steam locomotive cranes, where it is used for lifting magnets. Today locomotive cranes are in demand as never before; and as many of these cranes are now equipped with electromagnets, this unit enables the purchaser and the user of these locomotive cranes to have all the advantages of the electric locomotive crane in handling scrap and pig iron. It is needless to say that today, with the scarcity of labor, any labor device in handling raw material in yards and factories is of high importance in getting out larger production. Its simple, rugged and reliable construction enables it to be used at great distances from machine or repair shops, as there are no reciprocating parts to wear out, and as practically the only attention which it requires is to have its oil well filled occasionally.

In building this 10 kw. set, the manufacturer has recognized that it must operate under the most trying conditions. For that reason, it is as simply constructed as possible, while yet having many of the features found desirable in larger units. Among

these is a hand and automatic throttle valve and an emergency overspeed governor. This latter feature is placed on the generator end of the unit and automatically closes the throttle valve of the turbine, if the unit should show a disposition to overspeed. The device consists of a small weight placed in the shaft of the unit which, at a predetermined speed, engages a trip lever connected in such a way to the throttle valve that it is automatically closed, thus stopping the unit.

The most important feature of this unit is that it is but one revolving element in which the generator shaft is extended so that it also carries the turbine rotor. This not only makes a very compact machine, but eliminates all coupling and misalignment troubles, and dispenses with turbine bearings and packing.

The turbine rotor is made of a high-grade, open-hearth steel forging, accurately finished, in the periphery of which are placed blades of electro furnace steel, which are held



These sets are fitted with all the refinements of the larger units.

in place by pins tightly driven in through blade and rotor. The blades are of the impulse type and although there is only one row of blades, yet by means of a reversing chamber the same steam is passed through the blades a second time, thus allowing complete expansion of the steam.

Since the unit is designed to occupy the least possible space, the manufacturer has equipped the generator with ball bearings (no bearings being required on the turbine instead of the usual type of surface bearing, thus saving in bearing friction, with a consequent decrease in length and weight of the unit is effected. Moreover, these self-aligning ball bearings on small units are suited for a variety of services, particularly for marine work, which oftentimes compels the unit to operate at an angle, due to the position of the ship.

As is shown in the illustration, all open places on the unit have been covered with pieces of expanded metal which protects not only the operation but also the generator parts from incoming foreign matter. Its compactness (the unit is only 3 feet 8½ ins. long, 23 ins. wide and 18¾ ins. high), together with its lightness, is to be used where space is valuable or for portable work.

WESTINGHOUSE MAN PROMOTED

A. B. Cole has been appointed assistant to manager, department of publicity, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., to succeed M. C. Turpin, who has accepted a position in the ordnance department at Washington, D. C.

Mr. Cole will have charge of the editorial work, including the preparation of literature, and supplying information to the press.

He started his career as general car-shop laborer for the Grand Rapids, Grand Haven & Muskegon Railway, Fruitport, Mich., with the idea of obtaining a first-hand working knowledge of electric railway operation. In June, 1909, he graduated from the School of Electrical Engineering, Purdue University, Lafayette, Ind., where he made a specialty of steam and electric railway studies.

On July 15, 1909, he entered the engineering apprenticeship course of the Westinghouse Electric & Manufacturing Company, and completed this work February 6, 1911. While on the course he was engaged, in addition to the regular shop testing, on railway project work in the general engineering division and as a railway sales correspondent at East Pittsburgh and afterward in the Cincinnati district office.

In November, 1912, Mr. Cole was transferred to the department of publicity to prepare railway publications and a year later was placed in charge of railway and large power apparatus publicity. Later he was given charge of railway, power, marine and R. D. Nuttall Company publicity, which position he held up until the time of his appointment as assistant to manager.

Recently Mr. Cole has been co-operating on publicity matters with the American Electric Railway Association War Board at Washington, D. C., spending one-half of his time in Washington and the remainder in East Pittsburgh.

The Westinghouse Electric & Manufacturing Company a few months ago delegated Mr. Cole to make a general freight survey of a large number of the electric railways of Indiana, Ohio, Michigan, Illinois, Wisconsin and Iowa to determine what possibilities existed for a more extensive use of transportation facilities for hauling freight, relieving the steam road congestion, and thus helping win the war. The results of this investigation recently appeared in the Electric Railway Journal, co-ordinated with data secured by the American Electric Association War Board.

Mr. W. A. Haines has been appointed district representative at Detroit of the automobile equipment department of the Westinghouse Electric & Manufacturing Co. Among the automobile manufacturers of the Detroit district, Mr. Haines is well and favorably known through his service for some years as assistant district manager of that department of the Westinghouse Company.

CONCRETE MODEL BOAT

The model boat "Concrete" is the first concrete vessel built in Milwaukee, and as far as known in the first boat of moulded or poured concrete completed on the Great Lakes. It was built by the Newton Engineering Company at its Milwaukee Yards and was designed by George C. Newton, vice-president of this company.

This boat was built to test out certain construction methods involved in the Newton system of ship construction, and among the objects sought under these methods are the securing of as thin a concrete skin as possible and with special design of reinforcement. The Newton system aims to secure a practical method of concrete ship construction and one which will permit of using the forms for a number of times for standardized ship sections.

The "Concrete" has a length of sixteen feet, beam of forty inches, and moulded depth of twenty inches. The concrete skin is three-quarters of an inch thick and is supported at intervals of twelve inches by fabricated concrete frames. Its draft light is about seven and one-half inches and it has a total displacement of about two tons. There is also a concrete keelson and keel cast together with the skin, and one row of longitudinal concrete girders midway between the keelson and bilge. There is a concrete decking for three feet at the bow and for two feet at the stern, and a small section of deck amidships in connection with a concrete bulkhead. The lines are modeled on those of a cargo carrying barge, and in spite of blunt bow and stern the "Concrete" goes through the water with surprisingly little resistance.

For testing it out with power, a three and one-half horsepower Evinrude row boat motor is used. A speed of from four to five miles per hour is secured with this motor. A noticeable feature of the concrete construction is the freedom of vibration of the boat when the motor is running. Various collision tests have been made, such as ramming docks when under way, which have had no effect on the boat at all.



Schwartz furnaces at work in one of Oakland, California's largest brass foundries.

An interesting feature of the construction of this boat is the fact that all the methods used in the building of this boat were exactly the same that will be used for large ships. No difficulty was encountered in securing very good results on so thin a layer of concrete as three-quarters of an inch poured between forms. The proof of this is the water-tightness of this boat, which is never taken out of the water and which will remain perfectly dry for weeks at a time without even a trace of dampness on the inside.

The officers of the Newton Engineering Company believe that there is a big future ahead for the concrete boat construction. There are many advantages of this type of construction over steel and wood, such as the possibility of reinforcing to properly meet stresses in any direction, greater facility for making repairs, lower maintenance, freedom from rust and rot, absence of vibration, etc. Just as pleasing lines can be secured with concrete as with either of the other types of construction, and the outer surface so smooth as to offer the least frictional resistance when travelling through water.

FORM NEW ORGANIZATION

The Dravo Contracting Company, Pittsburgh, Penna., have announced they will operate their Neville Island plant as a separate department, to be known as The Dravo Contracting Company, Engineering Works Department. They have been manufacturing whirlers, steel towboats and barges for some time, and, due to very much increased business, they have found it advisable to make this change. They have contracts for 33 towboats and barges, the majority of which are for use by the United States Government. In addition to this, they have a large number of orders for tower whirlers for handling material at shipyards.

An entirely separate purchasing, accounting and engineering organization has been installed. Mr. J. D. Berg has been made vice-president of the Dravo Contracting Company in charge of the engineering works department.

Evidence of the prosperity of the working man and skilled labor under the new war-time conditions throughout the United States is revealed by the view of the situation taken by the automobile underwriter.

B. G. Wills, superintendent of the automobile department of the Fireman's Fund, in commenting upon the increased volume of automobile premiums of the company, is authority for the statement that a large percentage of the business from San Francisco brokers and business firms is on cars purchased by shipyard workers at the Union Iron Works and other plants.

Automobile salesmen are taking advantage of the sudden prosperity of this class of workmen, approaching the men when they emerge from the shops. Sales are often closed on the spot, the purchaser driving his new car home.



The model concrete ship of the Newton Engineering Company, Milwaukee.

A. Niedermeyer, for many years connected with the Worthington Pump and Machinery Corporation, most recently as works manager of the Snow-Holly Works of that corporation at Buffalo, New York, resigned on May 31st to devote his entire time to enterprises of his own.

Only As Good As the Man Behind It



L. H. Bill, president of the Fageol Motors Company.

FAGEOL force had been felt before, but a year ago it blew out, and it broke the ground to stay. The new factory of the Fageol Motors Company of Oakland stands there now like the Rock of Gibraltar.

Any factory measured by the quality of its product is only as good as the man behind it. The Fageol truck comes from men who are makers.

From its inception, L. H. Bill, now the president of the Fageol Motors Company, has been a factor felt in the automobile industry. His experience includes all phases of the business. Probably no man has had a wider scope. As salesmanager for Rambler and general manager for Jeffery and Nash, Mr. Bill stamped his personality on the motor car business of this country. Wherever he went success went with him. His experience carries him back to kindred industries. Before the automobile was made, Mr. Bill was known throughout the country for his ability as a bicycle distributor.

Eighteen years ago F. R. Fageol and his brothers built the first automobile in Iowa. That was in 1900. His entire time has since been given to the making and marketing of automobiles and trucks. The Oakland people bought cars of Frank Fageol, because he sold them rather than because of what he sold. The name of Fageol stood for undisputed integrity. Fageol service became a pattern, and by this method he so completely succeeded that he continually won the national factory bonus for the best dealer in the United States.

The Panama-Pacific International Exposition added both fame and fortune to the Fageol name. Fageol genius conceived the idea of transporting the crowds around the grounds in trains. On his Fadgl auto trains he pulled ten tons of people at a time with a Ford motor.

Later he produced the famous Fageol touring car, using the Hall-Scott air plane power plant. This car is the highest priced motor car built in America. Its production has been discontinued until after the war, because of the government's demand for the motors.

A premature production is a dangerous thing. No product was ever given more careful consideration by men who are masters than the Fageol heavy duty truck. Seventeen years of truck knowledge is concentrated in the Fageol. Once produced, the most gruelling and long-continued tests could discover no "bugs." Service by users for the past two years has proven the judgment of the men behind it.

Improvements in truck design have been few and far between. Most trucks of today are practically the same as those of five years ago. It is safe to say that the two most important advances made, both exclusive to Fageol trucks, are the result of Fageol genius.

Vital to the life of a truck is the lubrication of the chassis. In the past

ble and active. And with its springs working smoothly and naturally, the vital parts of the Fageol truck receive the absolute minimum of road shock.

The result is added life for the truck, better tire mileage, and greater comfort to the driver.

The Fageol compound gearset was developed to overcome the difficulties of operation on the heavy grades of mountain hauls and of the very bad road conditions in some parts of the country. In many instances, it even makes it possible to go into the field for loads where there are no roads at all.

This compound gearset is installed "amidship" on the chassis, back of the regular transmission, which is of the unit type. The construction is very similar to that of a regular transmission. The functions of this compound are controlled by an auxiliary lever mounted at the driver's left. This lever has but two positions. When it is forward, the sliding gears of the compound are enmeshed, multiplying the ratio of the regular transmission gear by $2\frac{1}{2}$ to 1, regardless of what gear the regular is in. Thus, if on a two and a half ton truck, the total reduction when in low gear on the regular transmission is 24 to 1; if the compound lever is thrown forward the gear reduction is then 60 to 1.

Higher gear ratios in the rear axle are installed when the compound gearset is used, enabling the truck to be operated faster without increasing the motor speed or fuel consumption, thereby making the earning capacity far greater.

There is nothing complicated in the construction of this unit and the operation is simplicity itself. With the great range of gear reductions made possible by it, giving six speeds forward and two speeds reverse, the Fageol truck, fitted with the Fageol compound gearset, can be operated



Frank R. Fageol, secretary and general manager of the Fageol Motors Company.

springs have been lubricated by grease cups, provided the driver attended to it. Neglected springs soon become stiff. They lose their ability to absorb road shocks. Instead they act as vibrators, transmitting road shocks through the truck frame to the vital parts, thus loosening, crystallizing and deteriorating.

The Fageol spring oiling system is automatic. Oil reservoirs, securely fitted to the spring and frame, carry an abundant quantity of oil, which is fed automatically to the spring-bearing surfaces and spring leaves by a wick and capillary attraction. Oil is not wasted. One filling lasts a month.

This system precludes a common truck disease—"hardening" of the springs." It keeps the springs flexi-



C. L. Butler, president of the Butler-Veitch Fageol Sales Company.



The first unit of the Fageol Motors Company factory at Oakland, California.

with profit on hauls and in service that would be impossible to other trucks.

Both of these features are the result of Fageol force, the minds of dynamic men. The Fageol factory maintains a corps of engineers, headed by Horace W. Smith, who are continually at work on the one idea—improvement. And their accomplishment has already been felt through these two inventions, more than the efforts of the vast multitude of like departments maintained in the Eastern factories. It is interesting to note that the Fageol patented spring oiling system was adopted by the Government for use on the Liberty truck.

That the entire force of Fageol factory could be turned over to production and advance, the matter of sales has been placed solely under the control of Butler-Veitch, which organization is reluctant to claim any credit for the rapid recognition accorded these trucks. Since the first of October almost two hundred heavy duty Fageol trucks have been delivered to users in Northern California. A year ago ground was broken for the new Fageol factory; already they are building a truck a day and that is not enough. Three times this year new units have been added to the Fageol buildings to accommodate the necessarily increased production. Plans are now under way to so arrange matters that sufficient trucks can be provided for distribution on the entire Pacific slope.

Southern California is already being given its share of Fageol products. The Fageol factory also produce an orchard tractor with a new tractive principle, known as the Fageol walking tractor.

A casting recently had to be moved for Uncle Sam. This casting alone weighed 33,000 pounds. The equipment on which it was carried—a special built solid oak axle, two-wheel bull trailer—together with the timbers and rigging weighed 7,000 pounds more. The task of moving this 20-ton load fell to a 5-ton Fageol equipped with a compound gearset. If this 400 per cent unload could have been handled on light grades, or even macadam roads, the task would have been different. But this casting had to go over a narrow-winding dirt road, up a continual grade, with pitches as high as 17 per cent and an average grade of 10 per cent. At first an effort was made to carry this load on a second truck with the trailer handling the heaviest weight. The carrying truck was to use its power and the Fageol to tow in front. It was too big a job. They could not work

together, so they gave the entire task to the Fageol alone—eight tons balanced on the rear over the wheels and 12 tons balanced on the trailer. In places the bull wagon wheels under the tremendous load buried in the apparent hard dirt. And again the rear wheels of the Fageol would spin with eight tons to drive home their traction, but the one 5-ton Fageol alone walked up the hill with the 20-ton casting.

It was a tremendous task. No truck is designed for such work, but the safety factor was great enough. The Fageol hauled this 400 per cent unload for over ten miles.

Another time a 2½-ton Fageol, loaded to capacity with zeroline, made the round trip into Yosemite and return from Oakland in the month of January in 46 hours elapsed time—four hundred and eighty miles, half of it in the mountainous roads of the high Sierras, in winter, in less than two days. And still again a 2½-ton Fageol, returning from Los Angeles with a capacity load of cased olives, covered the distance of almost 500 miles in less than 24 hours, total elapsed time.

The many fleets of Fageol trucks that have gone into the hands of careful buyers in the past six months evidence its merit in normal use as well as for these feature stunts.

Nothing succeeds like success. The minds of the men behind the Fageol products are being stimulated to greater achievement by the recognition accorded their present accomplishments.

A DRIFT BOLT DRIVER FOR SPECIAL WORK

While shipbuilders are bending every effort to speed up each step of ship construction, the builders of the tools that play so important a part have not been idle. Their task is the development of new and better machines, so that a few seconds may be cut from the time required for each operation.

The Ingersoll-Rand Company's latest contribution is an air hammer especially designed for drifting up bolts. This tool enables one workman to do in a short time that which would otherwise be a relatively slow task needing two men. There is also the consideration that the new hammer makes the work far less fatiguing.

The tool in question is styled Ingersoll-Rand No. CC-251 Drift Bolt Driver. Its distinguishing feature is a telescoping leg or air feed. This portion of the device consists of two sections of seamless steel tubing, one of which slides within the other and is provided with an air-tight cup leather. Air when admitted extends the tool until it is against the bolt to be driven, where it is firmly held by air pressure while the bolt is being driven. A single three-way throttle controls both functions of the tool.

The hammer element is identical with that of that other member of the Ingersoll-Rand line, the No. CC-25 Drift Bolt Driver. The new tool is very powerful and will drive bolts of one and a half inch diameter up to ten feet in length. It weighs ninety pounds, is fifty-five inches in length when air feed is closed, and seventy-seven inches in length when fully extended.

In its special field it is of distinct advantage and should be a welcome addition to the air tool equipment of the yards turning out wooden hulls.

Johnson & Higgins, the well-known marine insurance house, have opened an office in Montreal with P. L. Roberts, a well known Canadian insurance man, in charge.



The Fageol office in Los Angeles with a Fageol truck in the foreground.

TOWER WHIRLERS

In one of the large Delaware River shipyards can be seen (if you are lucky enough to secure a pass—and passes are scarce), an interesting installation of tower whirlers, which are playing a very important part in speeding up the shipbuilding program.

This particular installation consists of five tower whirlers, operating alongside of and between four shipways. Normally each shipway is served by its own tower whirler, those on the outside also handling material in the storage yards at either end of the line of ways. When necessary, however, each shipway can be served by two tower whirlers, one on each side.

It is further planned to run an additional track at right angles to the present tracks and install a sixth whirler thereon, to handle material from the yard at the head of the ways to flat cars, which will be pushed along so that the tower can unload and place material either directly upon the vessel under construction or in the storage space between tracks and ways.

"Tower Whirler" is a term that is compelling much attention at present, as it applies to a type of material-handling tool that is rapidly finding a hearty welcome in both wood and steel shipbuilding yards and in outfitting yards. It represents a traveling tower, on which is mounted a standard Dravo Whirler with a 55-foot boom, which can be rotated through about thirty seconds.

These towers are built of timber (though all-steel machines are also built), and range from 30 to 55 feet in height. They are mounted on a 16 to 20-foot gauge track, and are so built that a gondola car can easily pass underneath. Towers travel along the track at about 300 feet per minute.

One of the most important advantages of mounting the whirler on a 50-foot tower is that it places the operator in the most advantageous position possible. He is located high, yet at one side, where he can watch his load every instant. His position is better than if he were directly over the load, because he can judge vertical distances equally as well as horizontal. This is a great advantage in the placing of heavy plates and machinery within the hull of a ship (where reliance upon signals, which have to be passed through two signalmen before they reach the operator, is extremely dangerous both to the load and to the men handling it).

The mounting of the whirler on a high tower makes unnecessary the construction of extensive and expensive runways for the operation of traveling cranes high above the ship. In this case the only "runway" that is built is one long enough to carry the traveling whirler and tower.

Whirlers are built in various sizes, up to those that will lift ten tons 73 feet from the center line of the track. Those of this particular installation are capable of hoisting five tons at 53 feet, on a two-part line at the rate of 150 feet per minute.



One of the tower whirlers built by the Dravo Engineering Works of Pittsburgh, Pa., at work in an Eastern shipyard.

They can raise a two-ton load at 200 feet per minute.

For the hoist motor, a 65 horsepower, 230 volt D. C. General Electric motor is used. The swinging and traveling motors are of twenty horse-power each. The traveling motor is located on a deck part way up the tower, connected with the tower wheels by chains and sprockets. All are controlled by the simplest possible arrangement, directly before the operator at the base of the roof. He never has to take his eyes from his load, but is able to control every move with great precision and safety.

Two angle iron "third rails" are used, well protected by wood covering.

The electrical equipment makes necessary the use of but one man to operate the whirler. Where electrical power is not available as at many plants, whirlers are equipped with standard steam-hoisting and swinging engines and boiler.

Many yards are being built that do no shipbuilding at all, merely outfitting the ships built at other yards. These yards are giving the tower whirler very serious consideration;

some already have been equipped with this apparatus. They find the machine with the long boom of great advantage, as it is able to span the beam of ships at the dock, and because of the favorable location of the operator.

The order for the five tower whirlers above mentioned was placed with the Dravo Engineering Works, of Pittsburgh, October 25, 1917. The first machine was loaded on two 46-foot gondola cars and ready to ship from Pittsburgh December 21. The entire order was completed and ready for final shipment by March 14, 1918.

The August number of the Firemen's Fund Record, the official publication of the Fireman's Fund Insurance Company, will soon be mailed to the agents of the company. This little magazine embodies in its new form a distinctive change in size and shape from former numbers. It is planned to make the Record a clearing house for the exchange of ideas in underwriting as well as matters of importance concerning the relations of the company and its agents.

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Quarterly Review of Pacific Coast Launchings

HEREWITH is given a list of launchings from the shipyards in the three Pacific Coast States for the three months' period from April 20th to July 20th. While this list may not be entirely complete, it is sufficiently so to give a good idea of just what the Pacific Coast is doing to fulfill the country's demand for tonnage.

April 21st—Full wooden motorship, Alabama, 4200 tons, by Pacific-Alaska Construction Company, Seattle, Wash.

April 24th—Ferris type wooden steamer, Caponka, 3500 tons dw., by Grant Smith-Porter Company, Portland, Ore.

April 24th—Wooden Hough type steamer, Astoria, by the McEachern Shipyard, Astoria, Ore.

April 25th—Wooden steamer, Oakland, 3000 tons dw., by Pacific American Fisheries for their own account.

April 25th—Wooden steamer, War Haida, 2800 tons dw., by Cameron-Genoa Shipbuilding Company, Victoria, B. C.

April 29th—Wooden Ferris type steamer, Barabos, 3500 tons dw., by Coast Shipbuilding Company, Portland, Ore.

April 30th—Steel tanker, W. S. Rheem, 11,400 tons dw., by the Alameda plant of the Bethlehem Shipbuilding Corporation.

April 30th—Steel freighter, Western City, 8800 tons dw., by Columbia River Shipbuilding Corporation, Portland, Ore.

May 1st—Wooden Ferris type steamer, Yakima, 3500 dw., by Wright Shipyards, Tacoma, Wash.

May 1st—Wooden auxiliary, five-masted schooner, Gerbeviller, 3200 tons dw., by Foundation Company, Tacoma, Wash.

May 4th—Point Judith, steel freighter, 3800 tons dw., by the Albina Engine and Machine Works, Portland, Oregon.

May 4th—Wooden steamer, Kaskaskia, 4000 tons dw., by Grays Harbor Motorship Corporation, Aberdeen, Wash.

May 6th—Steel freighter, Western Spirit, 8800 tons dw., by Northwest Steel Company, Portland, Ore.

May 8th—Wooden steamer, Issaquena, Ferris type, 3500 tons dw., by St. Helens Shipbuilding Company, St. Helens, Ore.

May 8th—Wooden Ferris type steamer, Cheron, 3500 tons dw., by Seaborn Shipyards, Tacoma, Wash.

May 11th—Steel freighter, West Alsek, 8800 tons dw., by Skinner & Eddy, Seattle, Wash.

May 11th—Wooden steamer, War Atlin, 2800 tons dw., by Lyall Shipyards, Vancouver, B. C.

May 14th—Wooden Hough type steamer, Musketo, by Sommarstrom Shipbuilding Company, Columbia City, Ore.

May 15th—Wooden steamer, Blackford, 4000 tons dw., by Grays Harbor Motorship Corporation, Aberdeen, Wash.

May 15th—Wooden Ferris type steamer, Catawba, 3500 tons dw., by Fulton Shipbuilding Company, Los Angeles, Cal.

May 16th—Wooden Ferris type

steamer, Beloit, 3500 tons dw., Tacoma Shipbuilding Company, Tacoma, Wash.

May 16th—Wooden steamer, Barrington, 3500 tons dw., Coast Shipbuilding Company, Portland, Ore.

May 18th—Steel freighter, Fresno, 9400 tons dw., by Moore Shipbuilding Company, Oakland, Cal.

May 18th—Wooden steamer, Dalana, 4500 tons dw., 308 by 44.5 by 26 feet, by Supple-Ballin Shipbuilding Company, Portland, Ore.

May 18th—Steel freighter, Oshawa, 9400 tons dw., by Moore Shipbuilding Company, Oakland, Cal.

May 18th—Steel freighter, Volunteer, 11,800 tons dw., by Alameda plant of the Bethlehem Shipbuilding Corporation.

May 18th—Steel freighter, Governor John Lind, 5500 tons dw., by the Hanlon Dry Dock & Shipbuilding Company, Oakland, Cal.

May 18th—Wooden Ferris type steamer, Boulton, 3500 tons dw., by Meacham & Babcock, Seattle, Wash.

May 18th—Wooden steam schooner, San Diego, 1,600,000 feet, 250 by 45 by 21, for Hart-Wood Lumber Co., by Matthews Shipbuilding Company, Hoquiam, Wash.

May 18th—Wooden Ferris type steamer, Quoquo, 3500 tons dw., by McEachern Shipyards, Astoria, Ore.

May 18th—Wooden Ferris type steamer, Quoquo, 3500 tons dw., by Wilson Shipyard, Astoria, Ore.

May 20th—Wooden steamer, Bundarra, 4200 tons dw., for Australian Government, by Patterson-MacDonald Shipbuilding Company, Seattle, Wash.

May 23rd—Auxiliary four-masted schooner, Samuel H. Hedges, 3000 tons dw., by the Puget Sound Bridge & Dredging Company, Seattle, Wash.

May 23rd—Steamer, West Aspum, 8800 tons dw., by Skinner & Eddy, Seattle, Wash.

May 24th—Freighter, Vittorio Emanuele, 7500 tons dw., by the Seattle Construction & Dry Dock Company, Seattle, Wash.

May 25th—Freighter, Western Sea, 8800 tons dw., by J. F. Duthie & Company, Seattle, Wash.

May 27th—Freighter, Western Light, 8800 tons dw., by Northwest Steel Company, Portland, Ore.

May 27th—Wooden steamer, Capitaine de Beauchamp, 3000 tons dw., by Foundation Company, Portland, Oregon.

May 29th—Wooden steamer, Bromela, 4000 tons dw., by Grays Harbor Motorship Corporation, Aberdeen, Wash.

May 29th—Freighter, Willimantic, 7500 tons dw., by Seattle Construction & Dry Dock Company, Seattle, Wash.

May 30th—Wooden steamer, Kineo, 3500 tons dw., by the G. M. Standifer Construction Company, Vancouver, Wash.

May 30th—Freighter, Westford, 8800 tons dw., by the Ames Shipbuilding & Dry Dock Company, Seattle, Wash.

May 31st—Steam auxiliary wooden schooner, Lieutenant Pegoud, 3000 tons dw., by Foundation Company, Portland, Ore.

June 1st—Roy, wooden five-masted

schooner, steam auxiliary, 3000 tons dw., by the Foundation Company, Tacoma, Wash.

June 2nd—Isanti, freighter, 8800 tons dw., by the Schaw-Batcher Company, South San Francisco, Cal.

June 6th—West Cohas, freighter, 8800 tons dw., by Skinner & Eddy, Seattle, Wash.

June 6th—Fonduco, Ferris type wooden steamer, 3500 tons dw., by Sanderson & Porter, Raymond, Wash.

June 10th—Lonoke, Ferris type wooden steamer, 3500 tons dw., by Wilson Shipyards, Astoria, Ore.

June 11th—Mattapan, Hough type wooden steamer, 3500 tons dw., by Sommarstrom Shipbuilding Company, Portland, Ore.

June 11th—Mazama, Ferris type wooden steamer, 3500 tons dw., by Seaborn Shipyards, Tacoma, Wash.

June 11th—Dannermarie, auxiliary steamer, 3000 tons dw., by Foundation Company, Tacoma, Wash.

June 12th—Makanda, Hough type wooden steamer, 3500 tons dw., by McEachern Ship Company, Astoria, Oregon.

June 12th—Eyota, Ferris type wooden steamer, 3500 tons dw., by the Wright Shipyard, Tacoma, Wash.

June 15th—Montrolite, tanker, 427 by 54 by 31, moulded, 2500 h. p., by Ames Shipbuilding Company, Seattle, Wash.

June 15th—Bonnafon, Ferris type wooden steamer, 3500 tons dw., by Nilson & Kelez, Seattle, Wash.

June 18th—Adjutant Dorme, wooden steamer, 3000 tons dw., by Foundation Company, Portland, Ore.

June 18th—H. B. Lovejoy, wooden steam schooner, 2200 tons dw., by Ballard Shipbuilding Company, Seattle, Wash.

June 19th—Reims, auxiliary steamer, 3000 tons dw., by Foundation Company, Tacoma, Wash.

June 20th—Deranof, steel freighter, 7500 tons dw., by Seattle Construction & Dry Dock Company, Seattle, Wash.

June 22nd—West Ekonk, freighter, 8800 tons dw., by Skinner & Eddy, Seattle, Wash.

June 23rd—Coconino, Hough type wooden steamer, by Kruse & Banks, North Bend, Ore.

June 24th—War Nicola, wooden freighter, 2800 tons dw., by Lyal Shipyards, Vancouver, B. C.

June 26th—Arras, wooden steamer, 3000 tons dw., by Foundation Company, Tacoma, Wash.

June 27th—Diriwu, wooden steamer, 4200 tons dw., by Patterson Shipbuilding Company, Seattle, Wash.

July 4th—Dunkerke, wooden steamer, 3000 tons dw., by Foundation Company, Tacoma, Wash.

July 4th—Western Cross, steel freighter, 8800 tons dw., by J. F. Duthie & Company, Seattle, Wash.

July 4th—Osprey, wooden steamer, 3250 tons dw., by Anderson Shipbuilding Company, Seattle.

July 4th—Independence, freighter, 11,800 tons dw., by Alameda plant, Bethlehem Shipbuilding Corporation.

July 4th—Victorious, freighter, 11,800 tons dw., by Alameda plant, Bethlehem Shipbuilding Corporation.

July 4th—Defiance, freighter 11,-

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800 tons dw., by Alameda plant, Bethlehem Shipbuilding Corporation.

July 4th—Challenger, freighter, 12,000 tons dw., by Alameda plant, Bethlehem Shipbuilding Corporation.

July 4th—Major Wheeler, freighter, 5500 tons dw., by Hanlon Dry Dock & Shipbuilding Company, Oakland, California.

July 4th—Yamhill, refrigerator ship, 9400 tons dw., by Moore Shipbuilding Company, Oakland, Cal.

July 4th—Yaquina, refrigerator ship, 9400 tons dw., by Moore Shipbuilding Company, Oakland, Cal.

July 4th—Guimba, refrigerator ship, 9400 tons dw., by Moore Shipbuilding Company, Oakland, Cal.

July 4th—Nantahaka, freighter, 8,800 tons dw., by Shaw-Batcher Shipbuilding Company, South San Francisco, Cal.

July 4th—West Galeta, freighter, 8800 tons dw., by Los Angeles Shipbuilding & Dry Dock Company, Los Angeles, Cal.

July 4th—West Zula, freighter, 8,800 tons dw., by Los Angeles Shipbuilding & Dry Dock Company, Los Angeles, Cal.

July 4th—Western Star, freighter, 8800 tons dw., by J. F. Duthie & Company, Seattle, Wash.

July 4th—Anacortes, freighter, 7500 tons dw., by Todd Shipbuilding & Dry Dock Company, Tacoma, Wash.

July 4th—Delight, freighter, 7500 tons dw., by Seattle Construction & Dry Dock Company, Seattle, Wash.

July 4th—West Gambo, freighter, 8800 tons dw., by Skinner & Eddy, Seattle, Wash.

July 4th—Mono, Hough type wooden steamer, 3500 tons dw., by Fulton Shipbuilding Company, Los Angeles, California.

July 4th—Sosworth, wooden steamer, 3500 tons dw., by Allen Shipbuilding Company, Seattle, Wash.

July 4th—Wihaha, Ferris type wooden steamer, 3500 tons dw., by Grant Smith-Porter Ship Company, Aberdeen, Wash.

July 4th—Itanca, Ferris type wooden steamer, 3500 tons dw., by Grant Smith-Porter Ship Company, Aberdeen, Wash.

July 4th—Brompton, wooden steamer, 4000 tons dw., by Grays Harbor Motorship Corporation, Aberdeen, Wash.

July 4th—Broncho, wooden steamer, 4000 tons dw., by Grays Harbor Motorship Corporation, Aberdeen, Wash.

July 4th—Daca, Ferris type wooden steamer, 3500 tons dw., by Meacham & Babcock, Seattle, Wash.

July 4th—Wayucan, Ferris type wooden steamer, 3500 tons dw., by Meacham & Babcock, Seattle, Wash.

July 4th—Forster, Ferris type wooden steamer, 3500 tons dw., by Nilson & Kelez, Seattle, Wash.

July 4th—Blythedale, wooden steamer, 3500 tons dw., by Pacific American Fisheries, South Bellingham, Wash.

July 4th—Kenosha, Ferris type wooden steamer, 3500 tons dw., by Sanderson & Porter, Willapa Harbor, Wash.

July 4th—Chimo, Ferris type wooden steamer, 3500 tons dw., by Sea-

born Shipyards, Tacoma, Wash.

July 4th—Sewickly, Ferris type wooden steamer, 3500 tons dw., by Sloan Shipyards Corporation, Olympia, Wash.

July 4th—Coloma, Ferris type wooden steamer, 3500 tons dw., by Tacoma Shipbuilding Company, Tacoma, Wash.

July 4th—Fasset, Ferris type wooden steamer, 3500 tons dw., by Tacoma Shipbuilding Company, Tacoma, Wash.

July 4th—Bourneville, Ferris type wooden steamer, 3500 tons dw., by Wright Shipyards, Tacoma, Wash.

July 4th—Bloomington, wooden steamer, 3500 tons dw., by Hammond Yards, Eureka, Cal.

July 4th—Georgie Rolph, five-masted barkentine, 3500 tons, by the Rolph Shipbuilding Company, Eureka, Cal.

July 4th—Anette Rolph, five-masted barkentine, 3500 tons, by the Rolph Shipbuilding Company, Eureka, Cal.

July 4th—Cotteral, wooden steamer, 3500 tons, by the McEachern Ship Company, Astoria, Ore.

July 4th—Maratanza, wooden steamer, 3500 tons, by Somarstrom Shipbuilding Company, Columbia City, Ore.

July 4th—Benvola, Hough type wooden steamer, 3500 tons dw., by McEachern Ship Company, Astoria, Oregon.

July 4th—Necolah, Hough type wooden steamer, 3500 tons dw., by Grant Smith-Porter Ship Company, St. Johns, Ore.

July 4th—Wanza, Hough type wooden steamer, 3500 tons dw., by Sommarstrom Shipbuilding Company, Columbia City, Ore.

July 4th—Bonifay, Ferris type wooden steamer, 3500 tons dw., by Wilson Shipbuilding Company, Astoria, Ore.

July 4th—Blue Eagle, Ferris type wooden steamer, 3500 tons dw., by George F. Rodgers & Company, Astoria, Ore.

July 4th—Colindo, Ferris type wooden steamer, 3500 tons dw., by St. Helens Shipbuilding Company, St. Helens, Ore.

July 4th—Braeburn, wooden steamer, 4000 tons dw., by Peninsula Shipbuilding Company, Portland, Ore.

July 5th—Admiral Mayo, wooden auxiliary schooner, 2500 tons dw., by Puget Sound Bridge & Dredge Company, Seattle, Wash.

July 6th—Western Coast, steel steamer, 8800 tons dw., by Columbia River Shipbuilding Corporation, Portland, Ore.

July 6th—Western Comet, freighter, 8800 tons dw., by Columbia River Shipbuilding Corporation, Portland, Oregon.

July 8th—Western Main, steel freighter, 8800 tons dw., by Northwest Steel Company, Portland, Ore.

July 8th—Georgette, four-masted schooner, 2500 tons dw., by Columbia Engineering Works, Portland, Ore.

July 6th—Nashotah, wooden steamer, 3500 tons dw., by the Grant Smith-Porter Ship Company, Portland, Ore.

July 9th—John W. Wells, five-masted schooner, 4000 tons dw., by St.

Helens Shipbuilding Company, St. Helens, Ore.

July 9th—Commandant de Rose, wooden steamer, 3000 tons dw., by Foundation Company, Portland, Ore.

July 10th—Cabeza, Ferris type wooden steamer, 3500 tons dw., by Coast Shipbuilding Company, Portland, Ore.

July 12th—Arvonion, wooden steamer, 3500 tons dw., by G. M. Standifer Construction Corporation, North Portland, Ore.

July 12th—Montezuma, wooden steamer, 3500 tons dw., by G. M. Standifer Construction Corporation, North Portland, Ore.

July 12th—Belding, wooden steamer, 3500 tons dw., by G. M. Standifer Construction Corporation, North Portland, Ore.

July 12th—Moosebee, wooden steamer, 3500 tons dw., by G. M. Standifer Construction Corporation, Vancouver, Wash.

July 12th—Benzonia, wooden steamer, 3500 tons dw., by G. M. Standifer Construction Corporation, Vancouver, Wash.

July 12th—Cohasset, wooden steamer, 3500 tons dw., Hough type, by Coos Bay Shipbuilding Company, Marshfield, Ore.

July 13th—Umatilla, wooden steamer, 3500 tons dw., by G. M. Standifer Shipbuilding Corporation, Portland, Ore.

July 16th—Airlie, composite steamer, 4500 tons dw., by Supple & Ballin, Portland, Ore.

July 17th—West Gotomska, freighter, 8800 tons dw., by Skinner & Eddy, Seattle, Wash.

April 20th—Steel steamer, Western Chief, 8800 tons dw., by Northwest Steel Company, Portland, Ore.

April 20th—Wooden steamer, Anoka, 400 tons dw., by Peninsula Shipbuilding Company, Portland, Ore.

April 20th—Wooden steamer, Wakan, 3500 tons dw., by Grant Smith-Porter Ship Company, St. Johns, Ore.

April 27th—Woode nsteamer, Shepard Point, 3500 tons dw., by Motorship Construction Company, Vancouver, Wash.

April 28th—Wooden steamer, Coos Bay, 3500 tons dw., by Coos Bay Shipbuilding Company, Marshfield, Oregon.

April 30th—Wooden steamer, Commandant Challes, 3500 tons dw., by Foundation Company, Portland, Ore.

May 2nd—Wooden steamer, Cresap, 4000 tons dw., by Peninsula Shipbuilding Company, Portland, Ore.

May 11th—Wooden steamer, Lieutenant Branier, 3500 tons dw., by Foundation Company, Portland, Ore.

May 11th—Steel steamer, Point Adams, 3800 tons dw., by Albina Engine & Machine Works, Portland, Oregon.

May 15th—Wooden steamer, Kuwa, 3500 tons dw., by Grant Smith-Porter Ship Company, St. Johns, Ore.

May 25th—Wooden steamer, Waukam, 3500 tons dw., Grant Smith-Porter Ship Company, St. Johns, Ore.

June 24th—Wooden steamer, Louisa Bryne, 3000 tons dw., by Columbia Engineering Works, Portland, Oregon.



WAINWRIGHT MARINE FEED WATER HEATER

In the construction illustrated, as manufactured by the Alberger Pump & Condenser Company, 140 Cedar street, New York City, the Wainwright corrugated copper tube is used.

The general range of heating is from 90 to 212 degrees, using five pounds gauge pressure in the heater, although a selection can be made to heat the outgoing feed water to a temperature of about 222 degrees with five pounds back pressure (with steam temperature of 227 degrees), and with higher back pressure, of course, the temperature of the water leaving the heater would be proportionately increased.

It is claimed that the Wainwright corrugated copper tube agitates all particles of the water, throwing them against the hot tubes so that a much higher rate of transmission is secured in a heater of this style than with plain tubes.

All tubes are straight, may be inspected by moving a bonnet at end of heater farthest from the water connections and the construction permits replacing of tubes with a minimum of effort and delay.

As no steel or wrought iron is used inside the tube heads, and as the water comes in contact only with cast iron and copper, it is claimed that corrosion, which is common in heaters having steel shells, is avoided, and that owing to the fact no floating heads are used, accidents due to pulsations of the boiler feed pumps are avoided.

The manufacturers would be glad to supply bulletins on request, illustrating and describing the construction more fully.

WAINWRIGHT TURBINE BEARING OIL COOLERS

The use of steam turbines for ship propulsion has increased greatly the use of turbine bearing oil coolers as an auxiliary apparatus in marine work. In such installations requiring forced feed lubrication of bearings better results are obtained at high oil velocities, as it is of advantage to circulate a large quantity of oil through a small range of temperature, thereby keeping the oil moderately near the bearing temperature for the reason that warm oil absorbs heat more readily than cold oil.

With the exception of the tubes Wainwright oil coolers are made of cast iron throughout, thereby eliminating the possibility of corrosion from sea water in marine work and assuring durability and long service. By the use of the Wainwright corrugated copper tube a considerably higher rate of heat transmission is obtained in the cooler as the tube

corrugations cause a turbulent action and force all particles of the oil against the wall of the tube.

Wainwright coolers are designed on the counter-current principle with horizontal baffles cast into the shell, the warm oil entering the cooler near the point of discharge of the warm water, and the cool oil being delivered from the cooler at a point where the coldest water enters. This assures a uniform rate of heat transmission through all parts of the cooling surface. The tubes are expanded rigidly into both tube sheets, the small amount of expansion being taken up by the corrugations themselves. All flanges are fitted with special oil-proof gaskets. The tubes used are straight, easily cleaned or replaced, and oil connections are located in separate channels with covers on the ends, making it possible to open the entire outfit for inspection or repair without breaking any pipe connections. The tube heads are cast separately and bolted to the shell, eliminating any chance of breakage due to shrinkage strains of the castings.

The manufacturer of the Wainwright oil coolers, the Alberger Pump & Condenser Company, 140 Cedar street, New York, states that the construction offers compactness and maximum heat transmission with minimum requirements of cooling water and friction losses. They will be pleased to receive inquiries for equipment of this sort with full specifications of requirements.

The Chicago Pneumatic Tool Company announce the appointment of Mr. L. C. Sprague as their special representative in connection with the sale of pneumatic tools to railroads. Mr. Sprague was formerly connected with the Tool Company, but more recently has been connected with the railroad department of the H. W. Johns-Manville Company, New York City.

His long connection and association with the railroads of this coun-

try especially fits him for the work which has been assigned to him.

P. B. Findley, technical editor in the department of publicity, Westinghouse Electric & Manufacturing Company, has resigned from that position to enter the training school at the University of Pittsburgh, where he will take a special course in radio work, with the Signal Corps.

Before going to the Westinghouse Electric Company, Mr. Findley was editor of the *Electrical Age*, in which position he made a large number of friends in the electrical field who will wish him success in his military work.

BAY POINT PLANT BUSILY AT WORK

The new yard of the Pacific Coast Shipbuilding Company on the upper Suisun Bay has been cited by Charles Piez, vice-president of the Emergency Fleet Corporation, among the examples of notable accomplishments in the shipyard industry on the Pacific Coast. Reviewing his recent tour with Director General Charles M. Schwab in the current number of the official *Emergency Fleet News*, just received, he places the new plant, situated near Bay Point, among those which "deserve high commendation for excellency of design and celerity of construction."

Piez was among the official guests of the men at this yard when the fourth keel was laid early this month, the event marking exactly half a year from the breaking of ground for the construction of the plant.

The steady increase of the number of employes of the Pacific Coast Shipbuilding Company has necessitated several times enlarging the special train run daily to and from the plant, over the Southern Pacific, for the workers who live in Oakland, Berkeley and Richmond. When it started, it was a two-car train; now ten cars are being used. Moreover, there has been an increase also in the number of employes resident in towns near the plant.

Copies of a letter written by President Wilson to Edward N. Hurley, chairman of the United States Shipping Board, commending the Nation's progress in shipbuilding and disclosing the fact that the President has watched that progress in detail, have been received by officers and employes of the company. This letter, with one from Charles M. Schwab to the employes of the Emergency Fleet Corporation, is being sent from eastern headquarters to the various yards.



A BILGE WATER BALLAD

By M. A. T.

He had dallied long and often with
the festive Japanese,
On the lovely slopes of Hong Kong
he had won a Cantonese;
He had been a most high loved one
of a jealous-minded Sikh,
He had met Seattle's fairest as they
strolled along the Pike,
He had trifled the affections of a big
Alaskan squaw,
Loved a dusky senorita down in
tropic Panama;
With the lime-juice girls of Sydney
he was there to beat the band,
Till he met this brown affinity on
Tahiti's coral strand.
Where the hula drums sound loudest
you will find him every night;
If he's less than six vahines he'd
consider it a slight,
And you'd search all o'er the jungle,
try and coax him back to work,
But he'd only smile and grumble as
his shoulders he did jerk,
"Though they say back there in Frisco
I am somewhat of a bum,
I'm a prince here in Tahiti just for
half a jug of rum,
And the maidens back in Frisco they
can beat it in a drove,
For its me to my vahine and my
own small cocoanut grove,
For I'm thinking that I'll never sail
the briny any more,
But stick quite close to nature on
Tahiti's coral shore."
We missed him one fine morning
when the farewell whistle blew;
He had fled off to the jungle to a
spot that he well knew,
For a thirsty dusky charmer had
him anchored in her toils
In the valley of Futaua, where the
water breaks and boils.
He has donned a brilliant pareu and
his head is wreathed with flowers,
And the scent of tropic blossoms fills
his sunny waking hours.
He has fled, this oiler greasy, to this
dreamy, sleepy land,
To a life's that's free and easy on
Tahiti's coral strand.

L'envoi

Mention not his name in Coghlan's,
nor in Harder's—even so,
For the places that have known him
ne'er again his face will know,
For he's sleeping in the jungle where
the serried palm trees wave,
With his brown Kanaka children
romping noisily round his grave.
May the voice of First Assistant's
ne'er disturb the sleeping dead
And the sound of Hula Hula ever
echo o'er his head.
Still they whisper that his phantom
haunts the jungle as of yore,
Where the Hula drums sound loudest
down-on fair Tahiti's shore.

**1918 EDITION FIREMAN'S FUND
REGISTER NOW OUT**

The Fireman's Fund Register, larger than ever, and full of additional information invaluable to the shipping fraternity and kindred interests, is now off the press and ready for free distribution. Copies of this Register may be obtained at any marine agency or at the head office of the Fireman's Fund Insurance Company, 401 California street.

The enormous increase in shipping on the Pacific Coast has made it

necessary to increase the size of the book to accommodate the additional tonnage documented on the Coast during the previous year, while the growing popularity of this publication has made it advisable to enlarge the 1918 edition.

The Register, which is the only publication of its kind in this field, fills a peculiar place in the business structure of the shipping fraternity and is regarded by them as indispensable.

That the Pacific Coast is commencing to be a large factor in the shipping world, is indicated by the number of requests for this book coming from Eastern shipping and brokerage firms, as well as from abroad.

The 1918 Register contains in part: A complete list corrected to January 1, 1918, of all vessels documented on the Pacific Coast of North America and the Hawaiian Islands; a complete list of dry docks and marine railways on the Pacific Coast and the Hawaiian Islands; Northern Pacific weather statistics; pilotage and towage rates of the various ports on the Coast, and accurate locations of all Coast guard stations.

**A SAN FRANCISCO STOCK OF
HARDWOODS**

The July 1st Stock List of White Brothers, the large hardwood dealers of San Francisco, has just come from the press. This list shows a very strong line of the dry hardwoods that are now scarce throughout the East, such as quartered oak, plain oak and mahogany. It also shows a fine stock of Jenisero, the popular wood for inside finish. Jenisero is the hardwood used in the beautiful interiors of the Rialto and Monadnock buildings, the Hotel Whitcomb and the Fairmont Hotel, all of San Francisco, as well as for the interiors of many fine residences and boats built up and down the Coast. This wood embodies the qualities of great beauty, hardness, which means durability and the taking of a fine finish, and moderate price, which combination accounts for the ever-increasing demand for Jenisero for all beautiful interiors.

REVIEWS

"Concrete Ships" is the title of an interesting booklet issued by the Portland Cement Association and consisting of a pictorial history of the marine uses of concrete from 1849 to 1918, showing the gradual advance from the concrete row boat to the large concrete ocean-going vessel.

"The Naval Constructor," by Geo. Simpson, M. I. N. A., fourth edition, 880 pages, by D. Van Nostrand Company, 25 Park Place, New York, \$5.00 net. Simpson's Naval Constructor has become a highly valuable and standard handbook, and the new edition bears out the reputation of the first three issues of this work. Advantage has been taken of the exhaustion of the first three editions to prepare some new matter for the present issue as well as completely revising the former text where advances in ship design or marine engineering have made this advisable.

Among the new features are details of unit offsets for a great variety of vessels and an exhaustive chapter on steam heating as applied to ships. The press work and arrangement of the book leaves nothing to be desired and the latest edition of Simpson's Naval Constructor is destined to be more popular among naval architects and marine engineers than ever.

Attack. By Edward G. D. Liveing, published by the Macmillan Company, New York. Price 75 cents net. This is graphic and a splendidly written account of an infantry subaltern's impressions of July 1, 1916, and makes splendid reading for anyone who wishes to secure a right impression of just what a modern battle is like.

A War Nurse's Diary. Anonymous. Published by The Macmillan Company, New York. Price \$1.25 net. This book consists of a series of sketches showing vividly the work of the nurses at the front in the great conflict. The book has a gripping, throbbing interest, and gives a keen insight into the work of the noble women at the front.

Rego Welding and Cutting Apparatus is the title of the new catalog issued by the Bastian-Blessing Company of West Austin avenue and La Salle street, Chicago. Since the introduction of the oxy-acetylene industry in America, Rego oxygen, acetylene and hydrogen regulators have been standard equipment on many of the high-grade welding and cutting manufacturers' apparatus. With ten years of intensive investigation and experience behind them, this firm is in a unique position relative to the welding and cutting business and their latest catalog will be found of great interest to the managers of all plants where the oxy-acetylene process of welding or cutting is utilized.

Dry Steam is dealt with in the Tracy Engineering Company catalog No. 11, which is just off the press, and deals with the application of the Tracy Steam Purifier in boilers. The catalog contains a valuable discussion on the causes of wet steam from boilers and the principles on which the Tracy purifier works in obtaining dried steam. There is also a partial list of the large number of vessels built on the Pacific Coast whose boilers have been fitted with Tracy purifiers.

The Acme Engine Company catalog has just been issued, and is an active and pleasing exponent of what this firm, young in organization and old in experience, has accomplished already in the marine and stationary field. The catalog is devoted to the marine output of one, two, three, four and six-cylinder engines, a description of the special features, pictures of individual parts and a thorough discussion of the design. Anyone interested in power boat, tugboat, fish craft or pleasure boat construction or operation should have this catalog and a copy can be secured through application to the Acme Engine Company, San Francisco.

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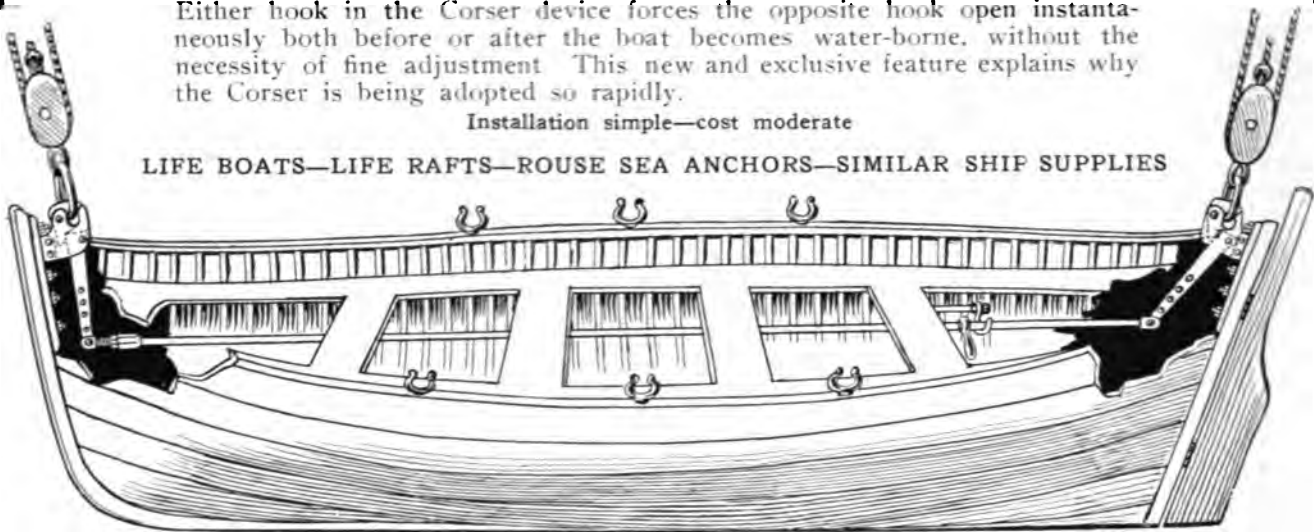
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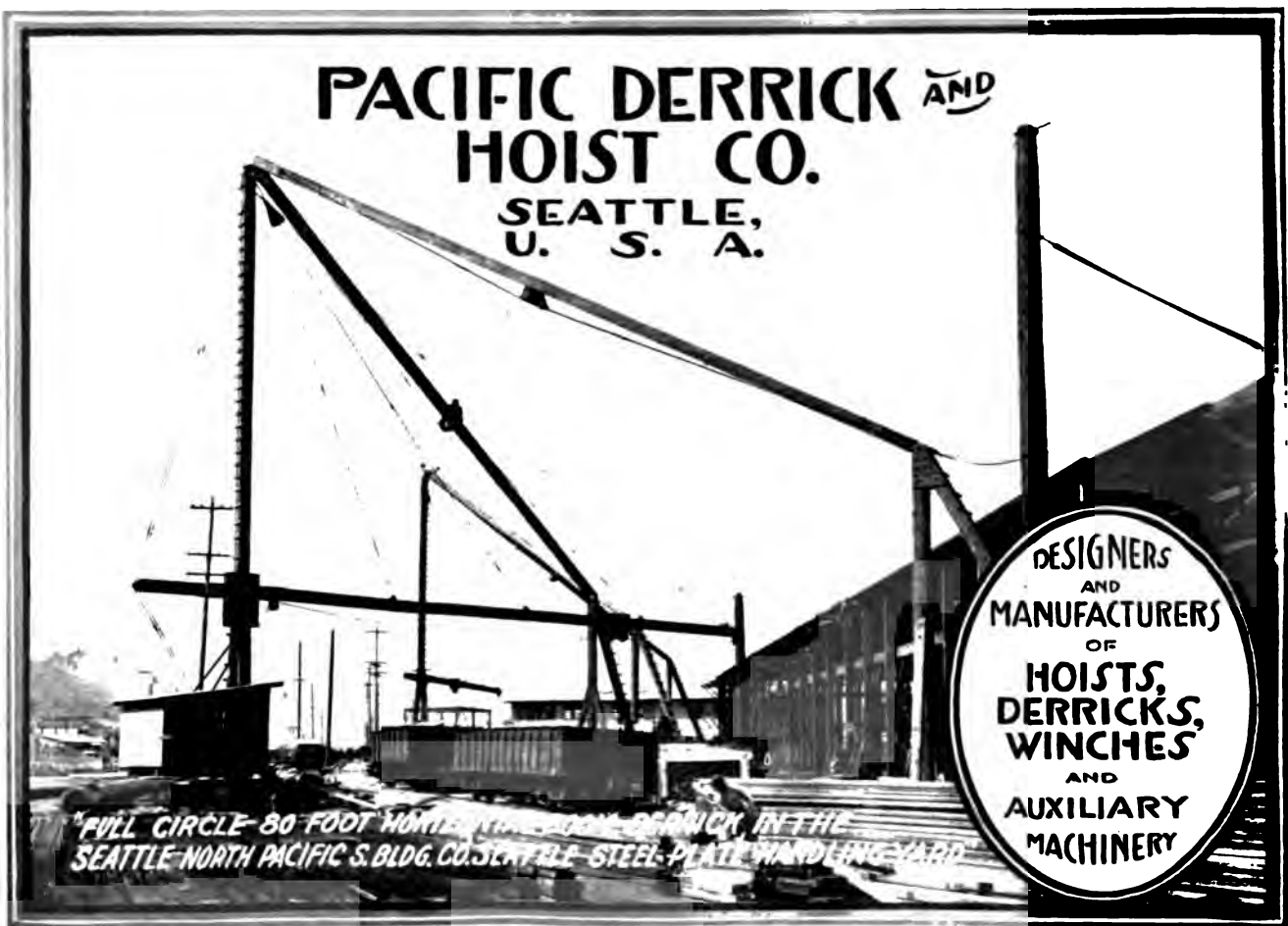
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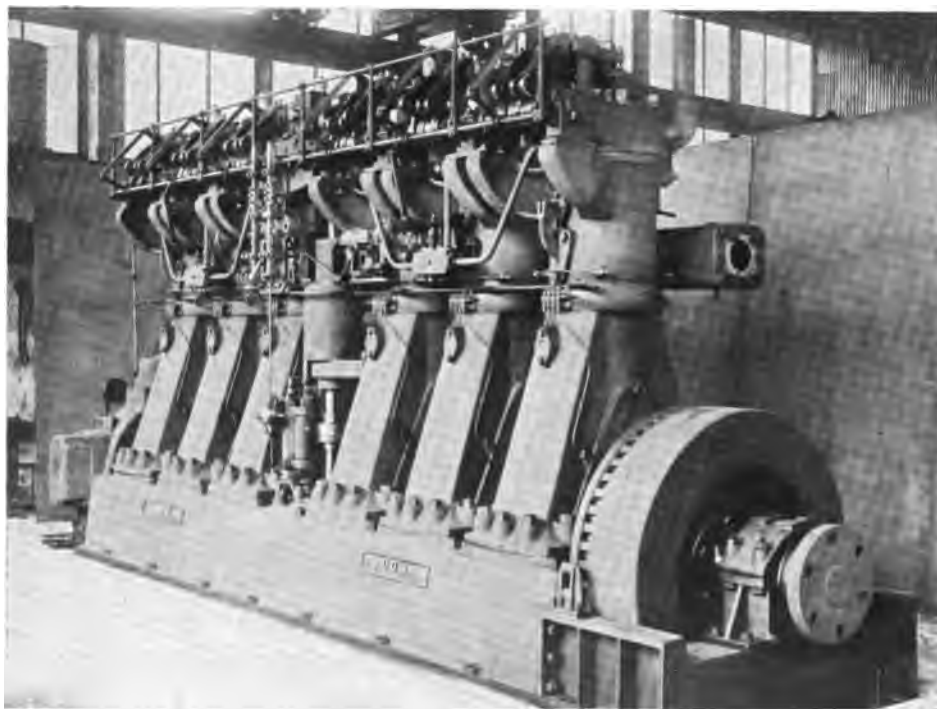
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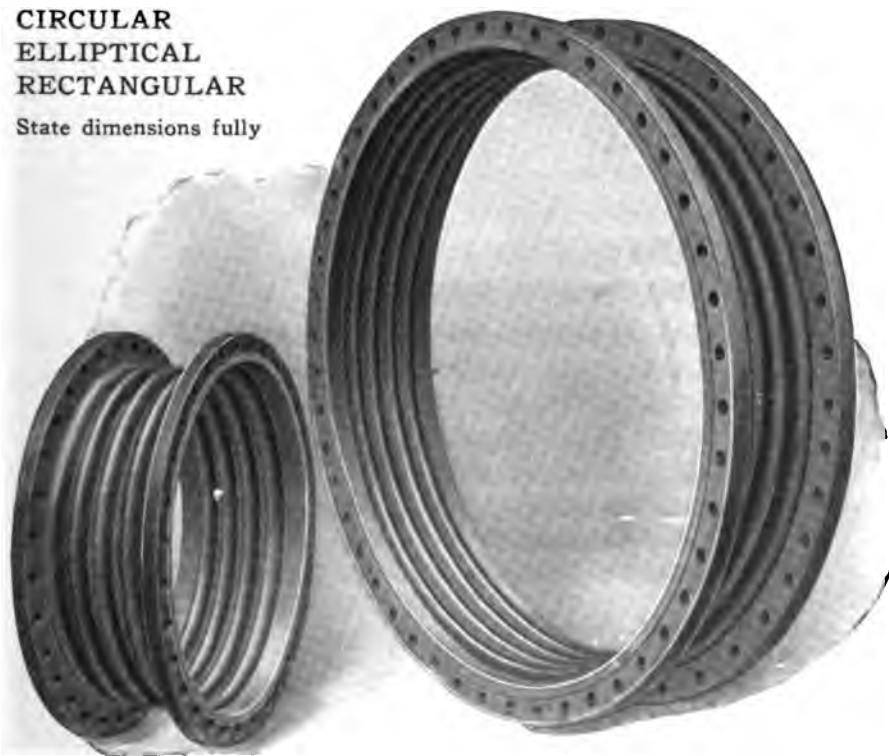
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New Releasing Hook Tests Up Well

THIS emergency demands releasing hooks that will permit a life-boat to be lowered on an instant's notice without waiting for the ship to slow down. The hooks must work absolutely together, regardless of the variation of the load in the boat. They must be so installed that it is impossible for them to become out of adjustment either by use or the action of the elements, so that they will be absolutely dependable at all times and under all conditions.

Corser releasing hooks are made so that the dog or lever on each hook is thrown towards the bow of the boat to fasten the hooks, and are both thrown towards the stern of the boat to release. This makes it possible to connect the lower ends of these dogs or levers with a straight pipe. This pipe, after being adjusted, will keep these dogs in the same relative position and makes it impossible for them to become out of adjustment, regardless of the amount of use they may be given.

However, no hooks requiring a fine adjustment are dependable, because any variation in the load, giving an added or less strain, will cause a variation in the connections, joints and working parts of the hooks, thus causing one to release before the other. Also, the action of the elements or use will cause a wearing in the same joints, connections and mechanical parts with the same results. But these hooks are so built that after the pipe is adjusted properly, if any circumstance causes the joints or connections to wear or give sufficient to amount to the shortening or lengthening of this connecting pipe even as much as four or five inches, the hooks would still work absolutely at the same instant for the reason that each hook in opening must force the opposite hook open. This large margin of safety places these hooks in a class by themselves.

This feature is shown clearly in the plan. In the bow hook, for instance, the hook is closed when the dog or lever is thrown toward the bow of the boat, as shown in the first position of the lever on the plan. In this position, it will be noticed, the upper corner of the dog marked "A" will rest in the notch at the lower end of the hook marked "B". As the lever is pushed open to the sec-

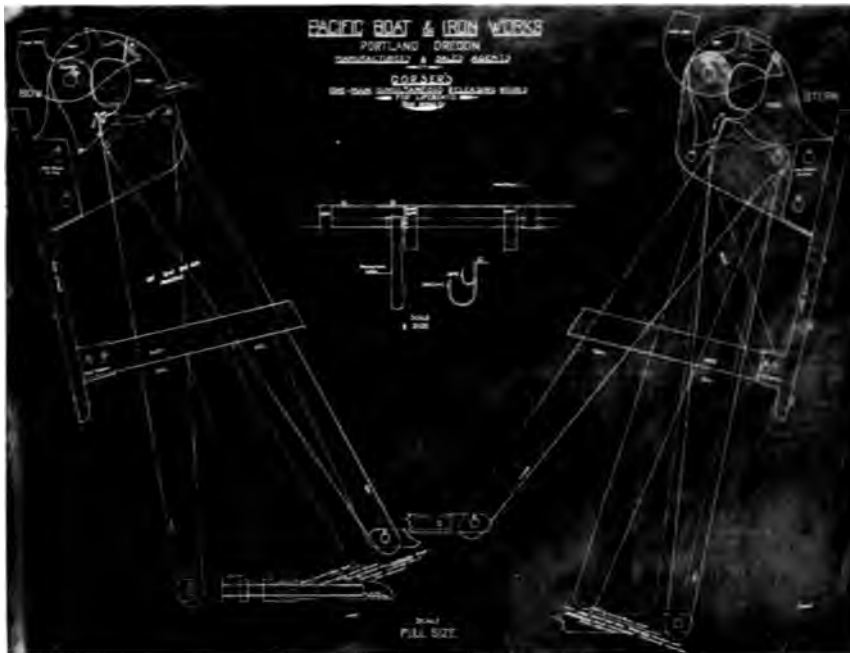


Diagram showing the operation of Corser's one-man simultaneous releasing hook.

ond position shown, the lower corner of the hook marked "C" will rest against the upper corner of the dog marked "A", and the hook will still be closed. As the lever is pushed from the second position to the third position shown, the corner of the dog marked "A" will be passing along the lower curved end of the hook "C-D", and the hook will not be open sufficient to release the boat until the lever passes the third position; or, in other words, the corner of the dog marked "A" is lowered sufficient for the corner of the hook marked "D" to pass. While the lever is moving from this second position to the third position, however, and the upper corner of the dog "A" is passing along the lower curved end of the hook "C-D" it will be noticed that the weight on the hook will be forcing the dog downward, and therefore pushing the opposite hook open.

It will be noticed also that the action is the same on the stern hook, except that as the lower curved end of the stern hook is passing the dog,

it will be forcing the dog downward and outward toward the stern of the boat, and will be pulling the bow hook open. Thus, it will be seen that if the pipe is not more than five inches short of the proper adjustment, so that the dog on the bow hook does not pass the third position shown, before the dog on the stern hook reaches the second position shown (at which point it will be released, the other hook being open and not retarding its motion), the hooks will work absolutely at the same instant. Likewise, it will be noticed, if the adjusting pipe is not more than five inches longer than the proper adjustment, so that the dog on the stern hook does not pass the third position shown, before the dog on the bow hook reaches the second position shown (at which point it is released, the opposite hook being open and not retarding its motion), the hooks will open absolutely at the same instant. Thus, it will be noticed, that if the adjusting pipe is adjusted within a

(Continued on page 187)

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(Continued from page 182)

range of ten inches, it will be absolutely impossible to release either hook when there is weight on them, without at the same instant releasing the other.

Attention is called to the fact that there are only two moving parts to these hooks—the lever and the hook itself. There are no joints to work loose, and they are so installed that it is impossible for them to become out of the same relative position, regardless of the amount of use they may be given. But if they are not installed properly, or for any reason become worn or out of adjustment, or the boat gives when loaded, they will still work absolutely at the same instant, as neither hood can be released without at the same instant forcing the opposite hook open.

Heretofore there have been just two kinds of hooks on the market—the water buoyant hook and those which are released with a mechanical device in the boat intended to release both hooks at the same time. No other hooks have the feature of one hook forcing the opposite hook to open. The water buoyant hook has the fatal defect that the boat when being lowered may strike the sides of the vessel or one end may become buoyant on the crest of a wave before the other, with inevitably disastrous results. The other hooks may be released by one man safely, providing the hooks have not become worn by use and they are adjusted to a fine point at the time they are required and the same load is in the boat under which they were adjusted. We believe that such hooks absolutely cannot be depended upon except under those circumstances and those circumstances will never exist all at the same time.

All this uncertainty and danger are eliminated in these hooks and a life-boat can be released when a vessel is moving as well as when it is stopped, and can be released before or after the boat becomes waterborne, and they can be absolutely depended upon at any and all times, and under any variations of the load in the boat or under any conditions that may be met.

SMALL GEARED TURBINES

To drive small electric lighting outfits, exciter units for large alternators, or for direct mechanical drive, there has been a demand for a line of steam turbines, which would be constructed along the same lines which would give ability, ease of adjustment, and high economy to the larger turbine units. To meet this demand, which now comes principally from our new merchant marine for lighting sets, the Westinghouse Electric & Manufacturing Company has developed a line which is being manufactured in sizes from 15 to 50 Kw. for direct-current service; from 30 to 50 Kw. for alternating-current service, and from 30 to 100 horsepower for mechanical drive.

This machine is a geared unit, very compact, and of rugged construction, as shown in the view of the direct-current unit, Figure 1. The turbine operates at a speed of 7,200 r.p.m., and it is suitable for both condensing and non-condensing operation. It is built for normal operation on any steam pressure from 75 pounds to 250 pounds and for non-

condensing operation on any back pressure up to 20 pounds. It embodies the three-point suspension principle, being supported by two lugs on the generator and one under the center of the turbine, thus maintaining perfect alignment of the turbine gear and generator.

The generator is of the well-known Westinghouse "SK" type, compound wound, with commutating poles. This design insures sparkless commutation, even at heavy overloads, without shifting the brushes—an important advantage, since no attention is required to adjust for charging loads. Coils are impregnated by the vacuum process, making them proof against even extreme dampness. The outboard generator bearing is supported by a single piece bracket bolted to the frame. In this a steel shell lined with babbitt forms the bearing itself; it is pressed and pinned into place, and in case of trouble, can readily be renewed by driving out with heavy hammer. Oiling is by a ring running over the shaft and dipping into an oil well. The shaft may be pressed out of the armature without disturbing the connection between coils and commutator. Liberal spaces for ventilation are provided.

The internal construction of the turbine is practically identical with that of the larger machines. It consists of a single rotating wheel with blades or buckets around its periphery, the steam from the directing vanes or nozzles impinging against these blades, cause the wheel to rotate and the work to be performed. The full energy of the steam is ex-

tracted by using only one wheel with the aid of what is commonly known as the re-entry principle; that is, the steam after passing through the blades the first time, is changed in direction by means of a reversing chamber, and is directed against the blades a second time. The nozzle and reversing chamber are made of phosphor bronze designed specially to resist the erosive action of steam at high velocities. In the fifteen and twenty-five kilowatt units, the nozzle block contains but one nozzle, while in units from twenty-five to fifty kilowatts capacity, the block contains two nozzles, one of which is controlled by a hand operated valve; at partial load this valve may be closed and thus the water rates are greatly decreased, and a much higher efficiency is obtained.

Bearings on the turbine end of this machine are cast iron, lined with babbitt. Those on the rotor and pinion shaft are of the adjustable type; thus making it possible to keep a perfect alignment between pinion and gear, at all times. The outboard generator bearing is a steel shell, lined with babbitt, pressed into the housing and pinned in place. It is ring-oiled. The pinion is milled out of the solid rotor shaft, thus entirely eliminating the coupling previously used to connect the pinion and rotor shafts.

These machines are fitted with standard water sealed glands of brass, shrunk on the shaft. These glands seal the turbine casing around the shaft, and prevent steam from escaping when operating non-condensing, or they prevent water from

(Continued on Page 231)

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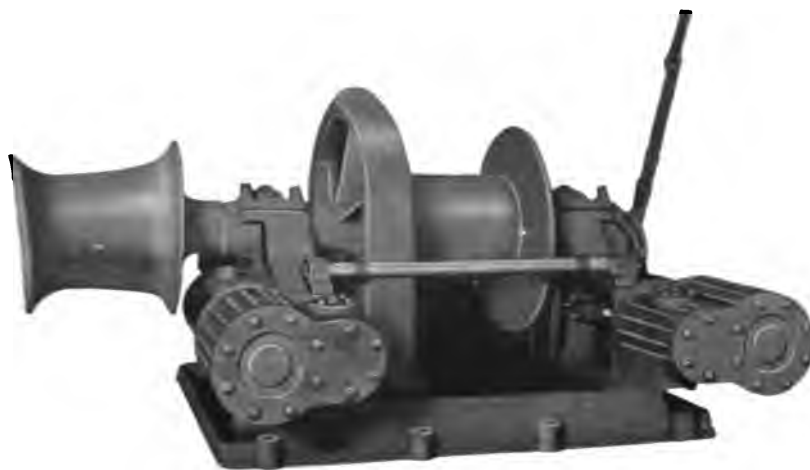
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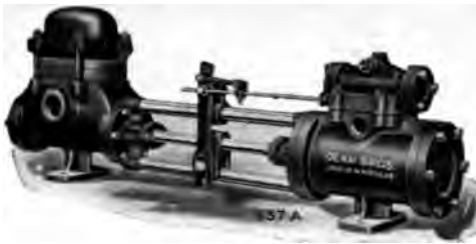
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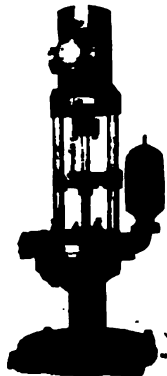
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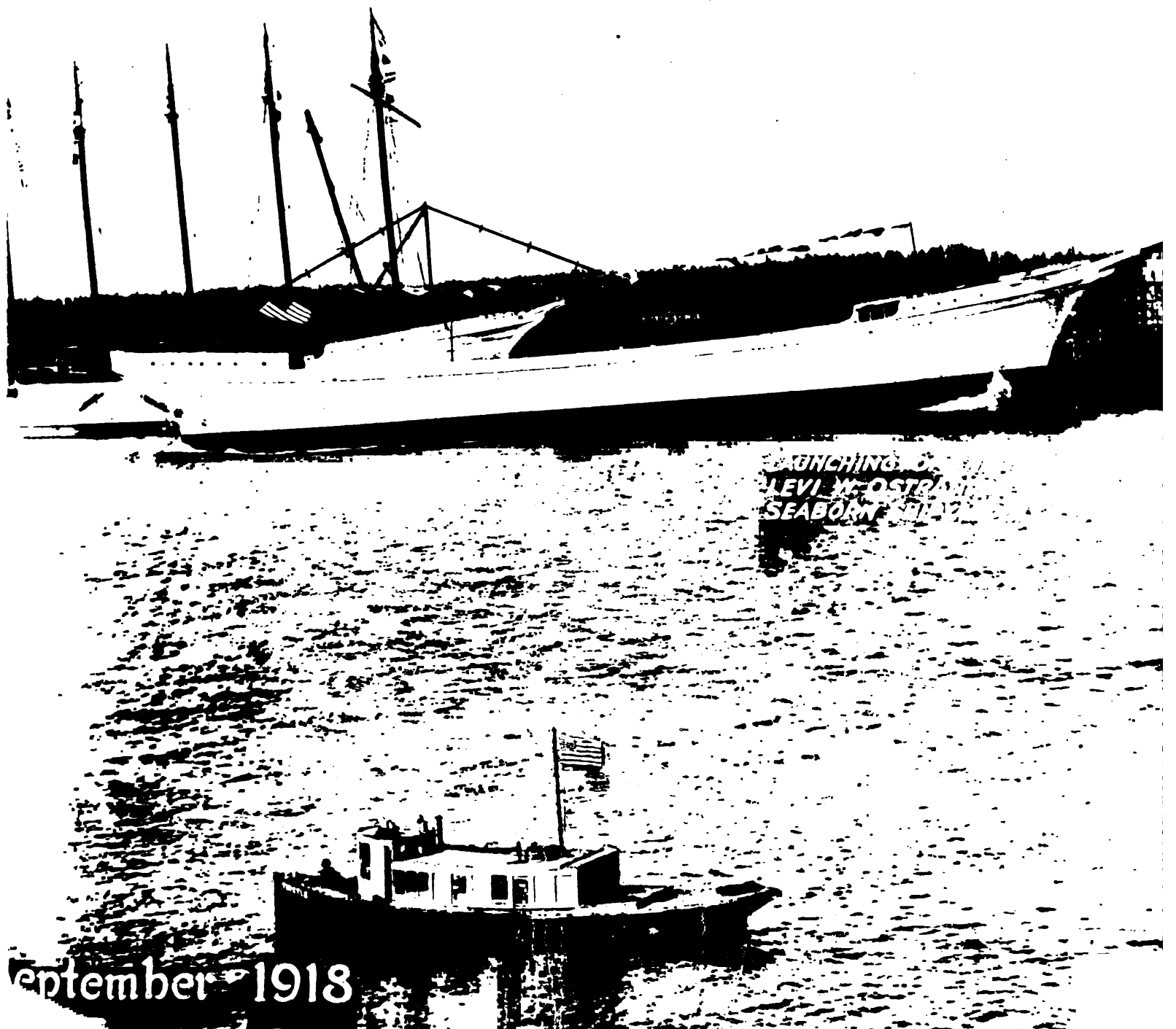
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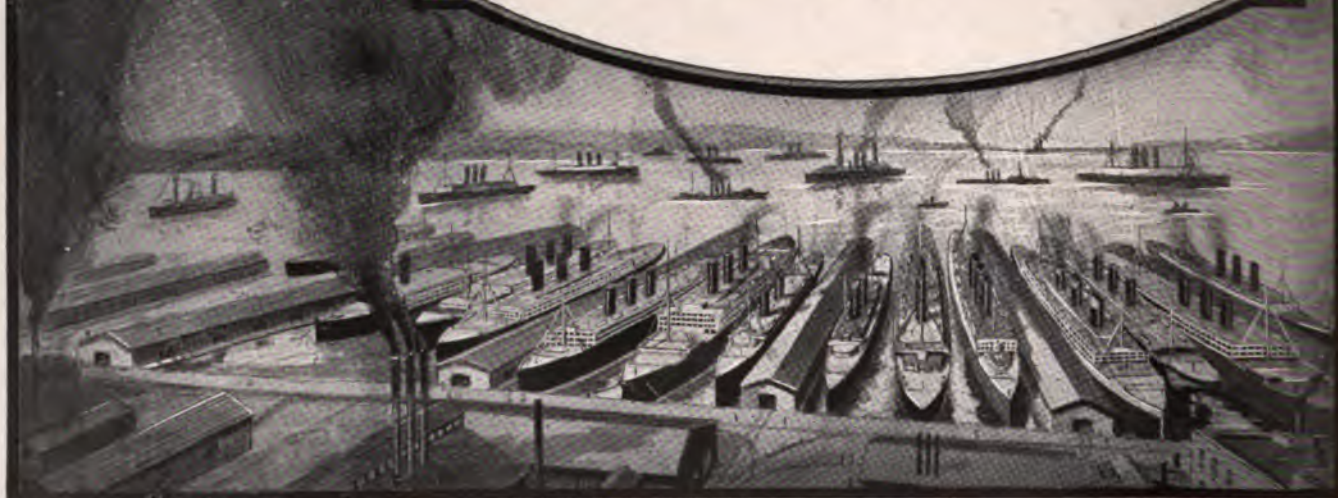
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PACIFIC MARINE REVIEW

September, 1918

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A Tribute to the Memory of Geo. W. Dickie

By C. E. Grunsky, President The American Engineering Corp.

Those who knew Mr. Geo. W. Dickie mourn with his family. His death has removed from the engineering profession a man of rare attainments and attractive personality whose achievements in his life work of shipbuilding and whose writings on related subjects have given him an international reputation.

When in the Spanish-American war the "Oregon" of the United States Navy made that famous dash around South America from Pacific Coast waters to the Caribbean Sea, he became known in every household of this country as the "Builder of the Oregon."

He was called to his final rest on August 17th, without warning and while still remarkably vigorous in mind and body and actively engaged in the service of the United States as Chief Inspector at the Moore shipbuilding yards, Oakland, California.

Having known Mr. Dickie for over thirty years and deeply appreciative of his human qualities, I may be permitted a few words relating to his character and his professional standing without attempting a review of his achievements. No one ever came into close contact with Mr. Dickie whether socially, professionally, or in business without profiting by such contact. His personality was an inspiration. Always kindly and helpful and absolutely fair in his dealings with his fellow-man, he could claim the confidence, respect and esteem alike of those whose industrial affairs he directed and of those who worked under him. This varied and long experience and his contact with affairs and with men of prominence from all parts of the world and a habit of close observation coupled with a retentive mind and a happy faculty of expression made Mr. Dickie a most charming companion and an entertaining writer. As related by him with a flavor of Scotch humor, the simple story of how as a boy upon the suggestion of his schoolmaster, who spent much time on scientific work, he acquired the necessary lenses and built himself a telescope to view a comet, then in the sky, and how at a penny-a-look he turned its construction to financial profit is not alone a delightful reminiscence but a forecast of his later connection with the installation of the great Lick telescope on Mt. Hamilton, for which he designed and built the dome in which it is housed.

Mr. Dickie, who was born at Arboath, Scotland, on July 17, 1844, came to the United States with his parents in 1869 and in the same year reached San Francisco. Very soon after his arrival here, he had an opportunity of showing his confidence in his ability to do well any problem of mechanical construction that was presented. Answering an advertisement for some one skilled in the construction of a gas plant, he was employed to erect one at North Beach. By following the usual practice of benefitting by experience of others as related in professional papers and particularly by reference to the details of a gas plant recently completed in an English city and well described in a Scotch journal the work was carried to successful completion.

Soon thereafter a mechanical engineer to design marine engines was wanted—possibly at the Risdon Iron Works, San Francisco, but the place does not matter—and Mr. Dickie presented himself. "You will not do," he was told, "we need a mechanical engineer and you are a gas engineer." Thereupon he confessed that his attainments were all along the lines of mechanical engineering, he having served his apprenticeship in a railroad engineering shop in Scotland, with special attention to locomotive construction. He was thereupon or soon after employed at the Risdon Iron Works, where his work took a wide range. On one occasion he secured for his firm a large contract for mining machinery, making a proposition which was accepted over a proposal by Mr. Irving M. Scott for the Union Iron Works. This kind of successful competition won Mr. Scott's admiration and resulted in an offer to Mr. Dickie which was accepted and made him a member of the staff of a concern in which he had ample opportunity to apply his constructive genius. He was manager of the Union Iron Works from 1883 to 1905.

As a narrator of his personal experiences he was unique. He knew how to present them in a humorous vein and with a lesson nicely turned. And he was always ready when opportunity presented, to let others have the benefit of this fund of experiences which seemed inexhaustible. How effectively he could make his point appears from the following which happens to be before me. After returning from the Columbian Exposition in 1893, he told the Technical Society of the Pacific Coast of his impressions, and in the course of his remarks, to drive home the fact that local conditions must be duly weighed, he related the following occurrence: "One day at the engineering congress, in discussing a paper on river steamboat



The Late George William Dickie

construction, I was endeavoring to point out the advantage of compounding stern-wheel engines, recommending tandem compounds on each side, either condensing or non-condensing, when the author of the paper remarked that the first cost was the most important consideration in the construction of a western river steamboat; efficiency or durability being of secondary importance. 'But,' said I, 'the every-day expense of running must be an important matter, especially where transportation was effected so cheaply.' 'Why,' said the author of the paper, 'I am afraid that the gentleman from the Pacific Coast has had but a small experience with western river practice. As an example of economy let me give you an instance of a freight stern-wheeler in my district that made her daily runs for the last season of eight months on a total expense of \$2.25 for fuel, and this expense was caused by the carelessness of the crew one night not securing wood enough for the next day's run, necessitating the captain's buying wood enough to last until dark, as his method of taking on fuel would not work in daylight. In this case what would be the advantage of compounding?'"

That Mr. Dickie had an eye to the aesthetic even in the design of the engine or other machinery can hardly be better expressed than in his own words:

"I am often told that the useful only should be retained in any design. That is true, but who can say what is useful? Your best poet says—

"Nothing useless is or low,
Each thing in its place is best;
And what seems but idle show
Strengthens and supports the rest."

And then, after referring to several illustrations, asks the question: "In regard to our other surroundings, we are not satisfied with the bare necessities of existence, and why should we be so in mechanics?"

And so we find, too, that Mr. Dickie was a great lover of books and took much pleasure in collecting rare volumes. It was quite pathetic to hear him tell how his valued collection was destroyed in the San Francisco earthquake and fire of 1906. At that time Mr. Dickie was in the East supervising the construction of ships that were being built from his designs. The collection of rare books had been boxed and deposited for safe-keeping at Mr. Dickie's office in San Francisco, where they were reached by the fire and destroyed. Had they been left at the Dickie home in San Mateo they would have been preserved. A year later there came from England an agent of a dealer in rare books commissioned to purchase from Mr. Dickie certain rare volumes which it was known were in his collection. He was prepared to pay some thousands of dollars, and, like Mr. Dickie, was distressed when he learned that the trade could not be made because the books no longer existed.

Mr. Dickie wrote many papers bearing upon marine architecture and engineering, and also on matters relating to the American merchant marine. He was recognized as an authority on such matters and was widely quoted. He was thoroughly imbued with American ideals and was ever ready to serve this country to the limit of his ability. Immediately on the outbreak of the war he offered his services to the United States Government. His fertile brain was active and he sent on a number of propositions dealing with the protection of allied shipping against attacks by submarines. He was appointed chief inspector for the Government at the Moore Shipbuilding Works, as already stated, and despite his 74 years was rendering most efficient service when the last call came.

He possessed in a high degree the best character traits of the Scotchman. An idea of his probity and fairness to his fellow man will appear from the following circumstance related to the writer some months ago. Mr. Dickie had some time in the seventies loaned a few hundred dollars to a stranded Canadian who gave his note for the loan and left as a pledge certain shares of stock of no market value in mines located on the Comstock ledge. Neither interest nor capital were repaid. The note was outlawed. Meanwhile the Comstock properties came into prominence, the value of stock was soaring, and one day it occurred to Mr. Dickie to take the stock which he held to the Nevada Bank to ascertain whether it had any value. When he was told that it was worth \$75,000 he was so taken by surprise that his knees came near giving way, and he with difficulty withdrew from the bank. The stock was at once sent to the former owner, from whom, despite a fair offer, Mr. Dickie would accept nothing but a repayment of the loan and interest.

Mr. Dickie married Miss Anna Jack in 1873, and established a home in San Mateo, which has always been well known for its open hospitality. After the death of Mrs. Dickie, a second marriage followed in 1901 to Miss Louise Barney.

Mr. Dickie is survived by his widow, a daughter, Miss Anna Belle, and five sons—William S., chief of the draughting department at Mare Island; Alexander J., a rancher in Santa Cruz and Santa Clara counties, California; George W., Jr., who is with the Union plant of the Bethlehem Steel Corporation; James S., who is assistant to the president of the American Shipbuilding Company at Cleveland, Ohio; and Frederick M., editor of the Pacific Marine Review.

Mr. Dickie has been a useful man in the community. He had the esteem and love of those who knew him. He has left a place which none other can fill.

An Appreciation of the 8th Emergency Fleet District

OF all the varied activities which the entry of the United States into the world war suddenly threw into bold relief as the big outstanding industries which required herculean efforts, enormous expansions and untiring devotion and effort, none present a more remarkable spectacle of true American energy than shipbuilding.

The suddenly arisen and undreamed of task of providing ships in which to carry on transportation, soldiers, food and supplies and munitions of all kinds to France from the United States, made it necessary to form what is known as the United States Shipping Board Emergency Fleet Corporation.

With the organization of this corporation came great responsibilities, but such has been the success in carrying out the task for which it was formed that today the Emergency Fleet Corporation stands among the most important of the various branches of government service. This wonderful work has been given such wide publicity that little can be added here to what has already been well told in thousands of journals and papers throughout the country.

The Emergency Fleet Corporation has been very particular in the selection of its personnel, striving to secure the best experts for each particular service to be performed. The entire organization rests, of course, on the men in the hundreds of plants which are building the ships and the main work of the forces of the corporation is to help these men build the best ships, in the quickest time and in the greatest numbers. There are one hundred and fifty plants under the direct jurisdiction of the Emergency Fleet Corporation, employing approximately three hundred thousand men, who are building steel, wood, concrete and composite ships. The plants are too scattered to be helped and guided in their work from the central office, so the Emergency Fleet Corporation has divided the United States into eleven geographical districts along boundaries determined by geographical and transportation line reasons.

There is a central office for each district which acts as a clearing house of information and guidance, keeping the local plants and the home office of the corporation at Philadelphia in touch with each other. In this central office, as well as in the local plants, are such representatives of the different activities as may be necessary. The home office work, requiring about two thousand employees, is on such a large scale that it is divided into two main branches, each in charge of a vice-president. Mr. Charles Piez is vice-president in charge of construction and Mr. Howard Coonley is in charge of administration. Upon each rests the entire responsibility for all districts, and in turn the specialized divisions and sections. The Capstone of the pyramid is Mr. Charles M. Schwab, director general, who, representing the board of trustees of the corporation and through that body of men the United States Shipping Board, has been given the responsibility for the ship production program in its entirety. Each of the eleven districts, however, is a complete unit by itself, and each of these districts reports directly to the home office in Philadelphia. Such in brief is a limited outline of the

activities of the Emergency Fleet Corporation, and those who wish to ascertain the various correlations between the many divisions and subdivisions, the division of duties and the responsibilities resting upon each officer of the corporation, should consult some of the Emergency Fleet Corporation management diagrams which have recently been issued. The present article deals only with the work of one of our Pacific Coast districts, that designated as Number Eight.

For District Number Eight, embracing the States of Oregon and Washington, Captain John F. Blain was named as district officer, and William Pigott, district supervisor. Mr. Blain takes charge of steel production, while Mr. Pigott devotes his attention to the furthering of the vast wooden shipbuilding industry in the State of Washington.

In the selection of Captain Blain to take charge of the Northwestern district, the Emergency Fleet Corporation has picked a man with wide and varied experience, and under his guidance the shipyards of the Northwest have made many remarkable records, records which are all the more notable when it is considered that three short years ago this section of our country boasted but one shipyard. Captain Blain has had a very varied sea experience since 1892, when he went to sea at the age of fifteen. His first command was the brig "Pitcairn" in the Pacific Coast-Philippine Islands trade in 1901. Prior to that time, and starting as cabin boy, he served on the "John A. Dix", "Saratoga", "Benmohr", "Henry Failing", "Kong Sing", and "Gerard C. Tobey".

From 1901 to 1903 Captain Blain served as mate or master on the Pacific Mail steamer "City of Sydney", the "Valencia", the American-Hawaiian steamer "Californian", the transports "Thomas", "Sherman" and "Meade", and the "New York", "St. Louis", "St. Paul", "Haverford" and "Vaterland" of the American and Red Star lines.

He was master of the steamer "Custer" of the Philippine Islands Service and master of the steamer "Atlantic" during part of 1903-1904; executive and chief officer of the S. S. "Mejida" of the Imperial Ottoman Navy, and the steamer "Minnesota" of the Great Northern Steamship Company. From June, 1905, to January, 1906, he held the position of navigating officer and instructor in navigation on board the Pennsylvania nautical school ship "Saratoga". Captain Blain then commanded the S. S. "Pennsylvania" in the Atlantic, Pacific and Alaska trade.

On leaving the sea in September, 1908, he acted as inspector on two small government steamers constructed in Portland. On the completion of these vessels he accepted the position of manager of the Oregon Dry Dock Company. In 1911 Captain Blain entered the government service and acted as assistant inspector of hulls, for the steamboat inspection service at Norfolk, Virginia, and from there went to Boston as the United States local inspector of hulls.

Captain Blain was then with the Pacific Coast Steamship Company for three years, coming out from the East to become assistant general manager in charge of operations. In 1916 he severed his connection with the steamship company to become

vice-president and manager of the Washington Stevedoring Corporation. It was this latter position which Captain Blain left in May, 1917, to take charge of District Number Eight, consisting of the States of Oregon and Washington, for the Emergency Fleet Corporation.

At first Captain Blain had charge of all work, both wood and steel ship construction, in Oregon and Washington, but later divisions were formed which resulted in a distribution of labor and detail, when the Wood Division was formed for Oregon and Washington. Captain Blain appointed Captain Magee temporarily in charge; the home office of the Emergency Fleet Corporation afterwards named Mr. William Pigott as district supervisor, with Captain Magee as his assistant, with jurisdiction over all wood ship construction on all points on Puget Sound and Willapa Harbor and an additional district was created for wood ship construction at Columbia River points, followed by the appointment of Mr. L. J. Wentworth as district supervisor.

The officers of District Number Eight found themselves promptly deluged with work. The shipyards were rapidly filling up with work and the commandeering order of August 3, 1917, gave the newly-formed Shipping Board forces quite a fleet to look out for. Subsequent to the commandeering order and prior to the first of the present year, the Eighth District turned over 52,800 deadweight tons represented in six steamers, four of which were constructed at the Skinner & Eddy plant, Seattle, and two at the plant of the Northwest Steel Company, Portland.

During January, 1918, three steamers of a total deadweight tonnage of 25,100 were turned over in the Northwestern district. Duthie & Company turned over an 8,800 tonner that had been commandeered, the Seattle Construction & Drydock Company produced a 7500-ton steamer, and Skinner & Eddy finished the "Seattle", of 8800 tons deadweight, the first direct contract vessel to be turned over to the Shipping Board from any yard in the United States. The keel for this ship was laid on August 21, 1917; she was launched on November 24th, and sailed from Seattle on her first voyage on January 5, 1918.

During February the ship deliveries rose to eight ships, of a total deadweight tonnage of 70,600. Of these one of the 8800-ton deadweight standard type came from the Ames Shipbuilding & Drydock Company, two from J. F. Duthie & Company, one from the Northwest Steel Company, Portland; one from the Columbia River Shipbuilding Corporation, Portland; and three from the Skinner & Eddy plant. Of the Skinner & Eddy vessels delivered this month two were commandeered vessels, one being a tanker and the third a direct contract vessel. The keel of the direct contract vessel was laid September 4, 1917; she was launched on December 22nd and delivered on February 12, 1918.

During March the district produced ten ships of a total deadweight tonnage of 75,700. These were divided as follows: The Albina Engine & Machine Works, two vessels of 3300 tons deadweight each; commandeered steamers which were building for Norwegian interests: Ames Shipbuilding & Dry Dock Company, two steamers of 8800 tons deadweight each; Duthie, one of the same tonnage; Columbia River Shipbuilding Corporation, one 8800 tonner; Northwest Steel Company, one 8800 ton

freighter; Seattle Construction & Dry Dock Company, one of 7500 tons' capacity; and Skinner & Eddy, two 8800 ton deadweight ships, one of which was a direct contract vessel. The keel of the latter craft, the "Canoga", was laid on December 1, 1917; she was launched on February 26th and delivered on March 25th.

The records for April show that eight vessels of a total of 69,100 tons were turned over, and of these the Columbia River Shipbuilding Corporation were responsible for two 8800 tonners; the Northwest Steel for one vessel of the same type; the Seattle Construction & Dry Dock Company, one; J. F. Duthie & Company, two; and Skinner & Eddy, two. The latter concern again delivered one direct contract vessel this month, the "Ossimeke", her keel being laid December 26, 1917; she was launched on March 14th and delivered April 13th.

The month of May saw six ships of 52,800 tons deadweight delivered, they being all of the standard 8800 ton deadweight type. Of these the Ames Shipbuilding & Dry Dock Company, J. F. Duthie & Company, the Northwest Steel Company and the Columbia River Shipbuilding Corporation each delivered one ship, while the Skinner & Eddy plant again had two to its credit. Both of the Skinner & Eddy vessels were direct contract boats, that firm having finished the commandeered ships on its hands. In the case of one of these craft, the "West Lianga", her keel was laid on February 14th; she was launched on April 20th and delivered May 4th.

June proved a record month for ship deliveries to the Shipping Board in the Northwest, the lists showing that fourteen steel steamers of 112,300 deadweight tons were turned over to the service of the nation. The Seattle Construction & Dry Dock Company turned over the 10,000 ton freighter, "Walter A. Luckenbach", the largest freighter that had yet been constructed on Puget Sound, and also a 7500 ton standard freighter. The newly-completed Todd plant at Tacoma finished another 7500 ton deadweight steamer, while of the 8800 ton class the Columbia River Shipbuilding Corporation contributed one, the Northwest Steel finished three, Duthie one, Ames one, the Albina Engine & Machine Works two of 3800 tons each, and the Skinner & Eddy plant three 8800 tonners.

This gives a total for the district in the first six months of 1918 of forty commandeered vessels of 326,400 deadweight tons, of which Seattle delivered twenty-three of 197,800 tons and Portland seventeen of 128,600 tons. There were also nine direct contract vessels of 79,200 tons, all delivered by Skinner & Eddy. This gives a total for the six months of 49 vessels of 405,600 tons or, counting the steamers delivered prior to the first of the year, a grand total of 55 vessels of 458,400 deadweight tons.

From the first of August, Skinner & Eddy expect to deliver four vessels, or 35,200 deadweight tons of shipping per month. The plant of J. F. Duthie & Company is also making some splendid speed records, but it is by no means certain that the prize for record production will remain with the Puget Sound builders. If the past splendid records which have been made in the Portland district are any indication of the future tonnage to be turned out on the Willamette, Seattle will have to look to her laurels. However, the rivalry between the yards is as friendly as it is keen.



Captain John F. Blain, District Officer Eighth Emergency Fleet Corporation District

Photo, Bushnell.

During the month of June the Shipping Board discontinued its direct operation of vessels and as fast as the new ships are completed they are either turned over to the Navy Department or else to private firms for operation, and we know that any ship manned by American sailors will certainly give a good account of herself when she is passing through any danger zone.

During the month of June the Shipping Board began drawing tonnage from a new source, taking over four Japanese vessels of a total deadweight tonnage of 31,665, these ships being turned over as part of the tonnage which Japan agreed to deliver in exchange for steel.

In order to appreciate the development which has taken place in the shipbuilding industry, it is only necessary to go back a little over two years, when we find that the only steel shipyard on Puget Sound was the Seattle Construction & Dry Dock Company's plant, while Harbar Island was unoccupied with anything more pretentious than the clay pigeon traps of the gun club which were located on the present sites of the Ames Shipbuilding & Dry Dock Company and the Seattle North Pacific Company's shipyards.

At the present time the total value of vessels under direct contract with the Shipping Board or commandeered by that body represents a value for the commandeered vessels of \$90,000,000 and for the direct contracts of \$250,000,000. This represents a total of seventy commandeered steamers and 188 direct contract vessels, and when it is considered that up till the first of July only nine of the contract vessels had been delivered it will be understood what a splendid future is ahead of the shipyards in the Northwest district during the next year or two. In addition to this tonnage, four steel steamships, formerly German, have been commandeered.

While the steel shipbuilders of the Northwest have been covering themselves with glory and arousing the heartiest commendation of the entire country, the builder of wooden vessels has by no means lagged behind.

The wooden shipbuilding district embracing the Puget Sound territory is designated as District Number Eight, with headquarters in the Securities Building, Seattle, and is under the direction of Mr. William Pigott, district supervisor of the Division of Wood Ship Construction. On Mr. Pigott's staff of assistants are W. A. Magee, district manager; A. R. Hunt, chief machinery inspector, and C. V. Rice, technical assistant.

The work coming under the direction of the Division of Wood Construction in District Number Eight is being carried on at fourteen shipyards; four of which are at Seattle, four at Tacoma, two at Aberdeen, one at Bellingham, one at Raymond, one at Anacortes, and one at Olympia.

The Emergency Fleet Corporation officers, with their assistants, have personally supervised and assisted the construction of all wooden vessels in these yards, District Number Eight ranking among the first in efficiency of all eleven districts, having launched up to and including July 4th, 1918, thirty-three vessels of a total deadweight tonnage of 119,000. In addition to the hulls already launched, there are under construction in the district 283,501 deadweight tons of wooden vessels, which will be launched as quickly as completed on the stocks.

Including the July Fourth launchings, the records show the following output for the different yards in Number Eight District which had launched vessels up to that date: Babare Brothers at Tacoma had launched one vessel of 3500 tons deadweight; the Grant Smith-Porter Ship Company, six vessels of 21,000 deadweight tons; the Grays Harbor Motorship Corporation, seven vessels of 28,000 deadweight tons; Meacham & Babcock, three vessels of 10,500 deadweight tons; Nilson & Kelez Shipbuilding Corporation, two vessels of 7000 deadweight tons; the Pacific American Fisheries, one vessel of 3500 deadweight tons; Sanderson & Porter, one vessel of 3500 tons; Seaborn Shipbuilding Company, six vessels of 21,000 deadweight tons; the Sloan Shipyard Corporation, one vessel of 3500 deadweight tons; the Tacoma Shipbuilding Company, two vessels of 7000 deadweight tons; and the Wright Shipyards, three vessels of 10,500 deadweight tons.


Segregating the launchings by months, we find that there was one ship of 4000 deadweight tons launched in December, 1917; nothing in January, 1918; one ship of 3500 tons deadweight in February; four ships of 14,500 tons in March; two ships of 7000 tons in April; eight ships of 29,500 tons in May; seven ships of 25,000 deadweight tons in June, and ten ships of 35,500 deadweight tons during the first four days of July.

While further contracts are being let to the wooden shipbuilding yards of this district as fast as the ways are cleared to accommodate new construction, the new craft are a larger type of vessel than those built hitherto. Difficulty has been experienced in getting the material for the 3500 tonners and the vessel has also been judged too small for long ocean voyages, her bunkers accounting for too large a percentage of the total deadweight tonnage. The new wooden ships are either of the Daugherty or the Ballin type, with deadweight tonnage in the neighborhood of five thousand.

All the employees of the Emergency Fleet Corporation and all the executives and workmen in the shipyards as well feel that to win the war our first need is ships and to build ships successfully we must have earnest, skilled labor. Everyone is co-operating to avoid delay, as delay in some matters of minor importance may hold up the delivery of the ship. Everything is fabricated and all moves are made by schedule and the Emergency Fleet Corporation system keeps inspectors in touch all along the line of construction, from the raw material of the forest to the finished product of the shipyard. The task has been and still is a stupendous one, but it is being conducted in such a manner that the American people can point with pride at this important branch of our war activities.

CONCERNING OUR COVER

The launching picture used on our August number cover has called forth considerable comment and in answer to several inquiries we wish to state that we received this photograph through the courtesy of Mr. H. G. Seaborn, vice-president of the Skinner & Eddy Corporation, and that the vessel shown is the "West Ekonk", one of that firm's fifty-five-day 8800-ton deadweight ships and the tenth direct contract vessel they have constructed for the Emergency Fleet Corporation.



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WHAT WE OWE THE PIONEERS

WESTERN shipbuilders are receiving many congratulations these days and the praise that has been showered upon them by Shipping Board officials and others has been fairly won and richly deserved. When Irving M. and Henry T. Scott and their associates started steel shipbuilding in San Francisco and laid the foundations for the old Union Iron Works, they little dreamed that the day would come when shipyards would spring into existence from one end of the Coast to the other.

Laying aside the inspiring race for speed in launching a ship, a race that is highly spectacular and which has aroused keen interest in the shipbuilding program throughout the country, the dead-weight tonnage output per set of ways will show that the Western yards as a whole have a most remarkable shipbuilding performance to their credit. The wonderful showing that has been made has not been confined to the older yards, but firms that have been in existence for a short year or two and even those which are at present putting together their first hulls have not lagged behind in the great race for shipbuilding supremacy.

The showing made by the West has usually been attributed to favorable climatic conditions and perhaps a considerable measure of our success can rightly be put down as a result of good working climate throughout the year, but there are other and deeper causes than weather that have contributed their factors to the splendid results obtained.

A noted British shipbuilder toured the United States in the nineties and upon his return to England addressed a meeting of engineers and shipbuilders on the subject of possible American shipbuilding competition. He stated that if competition stated the American yard which he would fear most was the Union Iron Works at San Fran-

cisco, and when asked for a reason for his statement answered with the one word "initiative".

Up to the time when Robert Moran started his steel shipyard at Seattle, the Union Iron Works was the only large steel shipbuilding establishment along the entire western coasts of both North and South America. In common with the other great metal working establishments in San Francisco, such as the Risdon Iron Works and the Pacific Rolling Mills, it was brought up on and survived by pure initiative. The scope of work undertaken by these concerns was tremendous. Their mining departments undertook the construction of deep mining machinery such as engineers had never attempted elsewhere and in shipbuilding the same caring prevailed. Not only did this concern construct ships—it also built the engines, winches, made its own castings in iron, brass and steel; built its own electric power plants, and even constructed its own dynamos and motors. Removed thousands of miles from the source of supply, this plant made many large tools for its boiler and machine shops, and, in short, through the energy and daring displayed by its management and foremen and the skill of its mechanics—and they were real mechanics, being called upon to do almost everything in the way of machine and erecting work—the Union Iron Works was able to discount the disadvantages as to material and labor which it was forced to meet in competition with the old-established shipyards in the East. What was true of the Union Iron Works was also true in a lesser degree, this plant starting business much later, of the Moran plant at Seattle, now the Seattle Construction and Dry Dock Company.

In commenting upon the remarkable progress being made by our shipyards today, it is only just to recall these old concerns, for they furnished a nucleus of men and experience from which nearly every shipyard on the Pacific Coast has drawn heavily. These men had accomplished the seemingly impossible in the days gone by—they had met both success and failure with a smile—and when the country called upon them a few short months ago to perform another seemingly impossible feat they met the problem with a warm hand clasp, for to the most of them "seemingly impossible" was an old friend.

THE CONTRIBUTION OF MR. FERRIS TO SHIPPING BOARD DESIGNS

A GREAT measure of the credit for starting the present huge shipbuilding program of the United States Shipping Board, in so far as the selection and perfection of types is concerned, belongs to the former Naval Architect of that body, Mr. Theodore E. Ferris.

Mr. Ferris entered upon a shipbuilding career at an early age, being first employed at a wooden shipyard on Long Island. Later at the famous old Roache yard at Chester, Pennsylvania, he became acquainted with steel construction, studying draughting and designing. From that time on Mr. Ferris began adding rapidly to his store of steel shipbuilding and designing experience, being employed in turn at large shipbuilding yards at Baltimore, Philadelphia, Chicago and Detroit.

About 1890 Mr. Ferris became definitely identified with the designing and superintending end of the steel shipbuilding business becoming associat-

ed with the late A. Cary Smith and was in the office of this noted naval architect for seven years, during which time he worked on the designs of a large number of river and sound steamers and many of America's most noted yachts.

About 1898 Mr. Ferris became Chief Constructor and Superintendent for the Townsend and Downey Company, now the Standard Shipbuilding Company, at Shooters Island, New York. In 1903 he again joined forces with A. Cary Smith, this time as a partner, and this arrangement continued under the firm name of Cary Smith and Ferris until 1910. From 1910 until the present time Mr. Ferris has designed and supervised upwards of three hundred steamers and yachts and at the time when the United States Government's commandeering order went into effect there were thirty-five ships building in American yards for which he was the naval architect.

Mr. Ferris was appointed in April 1917 by General Goethals as Naval Architect and Consulting Engineer to the Emergency Fleet Corporation of the U. S. Shipping Board, and he not only designed ships of many types and sizes that are being built in the Government-owned yards, but it was also a part of his duty to examine and pass on all the plans and specifications submitted by private shipbuilding concerns in all parts of the country. These plans had to meet with his approval before the contracts were given for the building of the ships. He has designed and approved the plans of about 1,000 merchant vessels for the Government which are now in process of construction or for which the contracts have been awarded. At the Newark Bay shipyard, which is operated by the Submarine Boat Corporation, fifty 5,000-ton vessels designed by Mr. Ferris (known as the Ferris type) are being built and another 100 will follow. These are the first of the steel vessels constructed under the new system of standardization which was worked out by Mr. Ferris and which was approved by the United States Shipping Board. Mr. Ferris also designed 7500-ton vessels of standard type, 50 of which are being built by the American International Shipbuilding Corporation, and the Standard 8000-ton, 15 knot ships building by the same company. Mr. Ferris designed the 10,000-ton, 17 knot, special troop ships, several of which have been contracted for by the Government. He also designed some 300 Standard wooden ships, of 3500 tons deadweight, known as the Ferris type, now building for the Government.

Just at a moment when the work of Mr. Ferris was beginning to prove most useful, circumstances arose which led to his resignation and return to private practice. In common with various other prominent executives who have left the Government service, he found himself unable to adapt his personality and methods to his surroundings. Mr. Ferris, therefore, turned over his vast undertakings to other hands and resumed an interrupted task in other channels, where he felt that he could render a larger measure of usefulness.

Although it has been far from the wishes of Mr. Ferris to introduce the personal element into his services to the Government, a number of his friends have felt that his position should be made clear. In professional circles it is generally recognized that he did more than almost any other one man to launch the Federal shipbuilding pro-

gramme, and that it must be largely due to his plans that further work along this line will have had such an excellent start.

WHERE DUTY AND OPPORTUNITY COINCIDE

THE element of surprise has come to play such an important part in the fighting on the Western front that the German press explained the backing up of the late lamented trip toward Paris by charging that "Deserters from our army gave the enemy the time and place of the attack."

One gigantic offensive may be seen in the offing which is violating the accepted rules of the game of war by giving the Huns full information. It is an American drive and there appears no desire to hide the date, the points of attack and the objectives. It is generally agreed that the operation will be successful although victory must come with the hardest kind of effort.

The campaign will begin at noon September 28th; the front on which the attack is to be made is from the Pacific to the Atlantic, Mexico to Canada; the objectives are six or eight billion dollars and the time allowed is three weeks. The divisions to be engaged include every red-blooded American.

Our part begins now. Plan at least to double the investment you made in the last Liberty Loan because the Fourth will be at least double the size of the last one. Our boys never lag in the attack. They meet the Boche and his bullets more than half way. Let's back them up with our paltry dollars. Let's give them a square deal. Let's lend as they fight and that means crowd the banks the very first hour of the Fourth Liberty Loan offensive.

OVERTIME TO BE LIMITED

THE recent action of the Shipping Board in curtailing overtime on vessel building for the Emergency Fleet Corporation except where such work can be shown to be absolutely necessary is a step in the right direction. Shipyard overtime has been productive of serious evils and at the same time its effect on expediting work has been highly doubtful. It is only natural that the efficiency of a workman falls off materially after he has worked a certain number of hours with the result that his wage and a half or double wage becomes a triple wage if not more when measured in results obtained. Overtime cannot be evenly distributed. The demand for extra work falls almost entirely on certain classes of men. This means that the monthly wage return of these men becomes very heavy in comparison with the pay of those who are never called upon to work after hours. Dissatisfaction immediately makes itself felt and dissatisfaction quickly effects the output of the entire plant. Overtime pay may be "easy money" and it may not, but the man who does not get a chance to put in any overtime and hears about the lucrative returns of the man who does, certainly looks upon overtime pay as easy money and becomes envious of his fellow workman. Except in special and isolated cases there never was anything gained through overtime work that in any way compensated for the extra cost of having the work done.

NEW ANGLES ON THE LAUNCHING RACE

WE reproduce herewith a chart and a short article from the Emergency Fleet News which is self explanatory. The article is as follows:

The accompanying chart, showing the steel ships launched in the shortest time from date of keel laying, was prepared by the Statistical Section of the United States Shipping Board Emergency Fleet Corporation on information contained in reports of District Officers.

It shows that the "Tuckahoe," the 4,900-ton collier launched by the New York Shipbuilding Corporation in 27 days, still holds first place, with the "Lake Narka," built by the Cleveland plant of the American Ship Building Company, the "South Pole," the 6,200-ton refrigerator ship built by the Baltimore Dry Docks and Ship Building Company, and the "Defiance," the 12,000-ton cargo carrier built by the Union Plant of the Bethlehem Shipbuilding Corporation, in a virtual tie for second place.

The "Defiance" was built in 38 actual working days, according to the District Officer's report, although 46 calendar days passed from the date of keel laying to launching. The "Defiance" was one of four vessels launched for the Emergency Fleet Corporation at the Alameda plant of the Union Iron Works on July 4th.

The District Officer's report shows that the keel of this boat was laid on May 19th. From that date to July 4th there were six Sundays and two legal holidays, Memorial Day and the Fourth of July. Thus there were eight days in which no work was done on the "Defiance," and this reduces the actual working time to 38 days from keel laying.

It will be noted in this chart that the Eastern and Great Lakes yards are in the lead in point of fast shipbuilding. The American Ship Building Company's Cleveland plant holds fifth and sixth places with the "Lake Gedney" and the "Lake Duncan," built in 61 and 65 days, respectively, and the same company's plant at Superior, Wis., is in seventh place with the "Lake Aurice," built in approximately 66 days. Then comes the Bethlehem Union Plant again with the "Victorious," built in about the same number of days.

The Skinner & Eddy Corporation holds ninth, tenth, eleventh and twelfth places, with four 8,800-ton vessels.

In interpreting this chart it should be borne in mind that the records are based entirely upon the count of calendar days. This explains the discrepancy between the chart as printed herewith and the previous reports of record-breaking performances from the shipyards, which had to do only with actual working days on hulls.

A slight study of this table however will convince anyone that it is a very poor basis on which to study shipyard output. We have prepared a second table, for instance, which is reproduced herewith which takes the twenty-five record launchings and arranges them on a ton per calendar day basis which results in some remarkable changes in the order of production such as number one becoming number three and number four becoming number one, while even more startling number two becomes number fourteen and number twenty-five becomes number eight.

On the original list of twenty-five of the country's most rapid launchings, the Pacific Coast yards occupied eleven places as follows: fourth, eighth, ninth, eleventh, twelfth, fifteenth, seventeenth, twenty-first, twenty-third and twenty-fifth. Figuring these same launchings on the basis of ton per calendar day, (the original table published in the Emergency Fleet News taking no account of the size of the vessels) we find that the Pacific Coast places in the record would be as follows: first, second, fourth, fifth, seventh, eighth, ninth, eleventh, twelfth, and thirteenth.

It must always be borne in mind however in comparing time elapsed between the keel laying and launching of any vessel that the data has a very limited usefulness in determining the speed with which shipbuilding operations are going on in any particular yard.

There are many factors which might make for the speedy launching of a certain vessel; she might be rushed ahead while the vessels alongside of her lagged behind; the ways on which she was built might have been occupied for an unduly long time by the vessel immediately preceding her with the result that a great deal of material might have been fabricated for her hull long before her keel was laid, and then again there is a wide range in the percentage of completion at which a vessel is launched.

For these and many other reasons, the splendid launching records made by so many of our American shipyards while worthy of the highest praise as individual feats of industry and organization have very little use as a basis on which to form opinions as to the relative speed of our different shipbuilding establishments.

Perhaps the most satisfying comparison could be arrived at by using as a basis the deadweight tonnage actually delivered per set of ways per year.

RIVETS AS A CONSTRUCTION GAUGE

AT THE banquet of the Emergency Fleet Club on August 1st at Philadelphia, in the course of a speech Mr. Daniel Cox stated: That while July deliveries were short compared with June, the corporation was not behind in its program, but only a little out of step. He said that much energy had been devoted to making records between keel layings and launchings; that this was very spectacular and served to cheer the country up and that perhaps it was proper because thus far we have not lost much in our final purpose—delivery of tonnage. The number of steel ships actually under construction on August 3rd, 1917, was 152 of a total deadweight tonnage of 1,073,000. Today there are 352 steel ships under construction of a total deadweight tonnage of 2,500,000. The average daily drive or rivets last April was 646,000; in May, 751,000, and in June, 860,000. Mr. Cox also stated that in January it required 295 working days on the average to complete a ship; between January and June this time had been reduced to 270 days, while in June the average time taken to complete a ship was 240 days. There is cause for a deep feeling of satisfaction in these figures. We may reasonably expect the deliveries to fluctuate and the fact that June deliveries exceeded July deliveries does not mean that there was less accomplished in July

than in June. The result of the July shortage will probably be seen in a great increase for August. As far as the amount of steel entering into the construction of hulls is concerned, the monthly record of rivet drives will give a steadier and more dependable record in regard to the rate of construction than monthly delivery figures.

AMERICAN CREWS FOR SHIPS

WITH the success of its huge shipbuilding program assured, the United States Shipping Board will now concentrate its power on the manning of the merchant marine with all-American crews.

The Shipping Board's efficiency methods in putting the American shipyards on the way will be paralleled by Mr. Hurley in creating an adequate personnel for the merchant ships built and controlled by the Shipping Board.

Not only the war needs of the merchant marine will be considered in the launching of an extensive educational campaign, but a broad foundation will be laid by organization for maintaining a 100 per cent American personnel in the great peace fleet with which the United States will take a commanding place in world trade after the war.

The Shipping Board's manning program is based on the present and potential needs of the merchant service in coastwise and overseas traffic, for both existing and for new tonnage.

Since the war began the new tonnage has been divided between the Shipping Board and the Navy, virtually on a 50-50 basis, the ships assigned to the Navy being used in its overseas transport service.

Division of Tonnage

"This division of tonnage is based on an agreement between the Shipping Board and the Navy Department dating from last year, which has not been changed," said Mr. Hurley.

"The ships used by the Navy for transporting troops and animals as well as cargoes of war materials through the war zone are manned by naval crews. Ships making commercial voyages through the war zone and to all other parts of the world are manned by civilian crews.

"The Shipping Board recently gave the Navy Department an estimate of the number of men the Navy will probably need for the merchant ships turned over to it by the Shipping Board. It is now meeting its own needs for the country's commercial vessels by recruiting and training men for service in the civilian crews of the merchant marine.

Training System for Crews

"The Shipping Board since the war began has been building up a training system for merchant officers and crews that will now be used to its fullest capacity for producing the men needed in the merchant marine.

"This system, under the direction of the board's recruiting service, now has 10 training ships and receiving ships actually in commission, and 3 others authorized, 2 of the latter for the Gulf and the Great Lakes, respectively.

"The board's Atlantic training squadron, based at Boston, has 3 cruising training ships which make regular visits to Philadelphia, New York, Norfolk and to other ports. A receiving ship is maintained at New York and another at Norfolk.

"In a Pacific squadron are 4 training vessels, 2

based at San Francisco and 2 at Seattle. The Gulf training ship will be based at New Orleans and the Great Lakes ship at Cleveland.

Three Thousand Men Monthly

"The output of these training vessels will be 3,000 men a month. Young Americans from all sections of the country are wanted for this service. The board maintains more than 6,000 neighborhood recruiting stations at drug stores, where they may enroll. Their transportation will be paid to the nearest training station, and they will receive an intensive course in sea training that will fit them in the shortest possible time for service in the merchant fleets of their country. In the next 12 months approximately 36,000 will be accepted for training. Several thousand have already been trained."

Study of man power for the merchant marine from every angle presented by war conditions and the future trade requirements of the country is the duty of a special committee of the United States Shipping Board, the appointment of which was announced on August 2nd.

The committee is composed of George Nichols, of Boston and New York, cotton manufacturer and business organization expert; A. S. Hebble, of New York, connected with the Southern Pacific Shipping Service, and Dr. E. M. Hopkins, president of Dartmouth College, a recognized authority on labor problems, at present connected with the War Department. William C. Ewing, of Boston, formerly connected with the Boston Chamber of Commerce, is secretary. James Thompson, of New Bedford, Mass., will assist the committee, which has opened headquarters at 45 Broadway, New York, room 705.

Chairman Hurley has ordered that the committee make a searching study of all conditions in the merchant marine affecting the standing of American merchant officers and crews as a body, and to report on ways and means of putting American merchants' crews on the highest level of character, discipline, and efficiency.

CONTROL OF THE LABOR SUPPLY

ON August, 1st, the supplying of war industries with common labor was centralized in the U. S. Employment Service of the Department of Labor, and all independent recruiting of common labor by manufacturers having a payroll of more than 100 men was diverted to the U. S. Employment Service. This is in accordance with the decision of the War Labor Policies Board and approved by the President on June 17th. (The War Labor Policies Board is composed of representatives of the War, Navy, and Agricultural Departments, the Shipping Board and the Emergency Fleet Corporation, the War Industries Board, and the Food, Fuel, and Railroad Administrations. Its chairman is Felix Frankfurter, Assistant to the Secretary of Labor.)

The above action was found necessary to overcome a perilous shortage of unskilled labor in war industries. This shortage was aggravated by an almost universal practice of labor stealing and poaching.

While the restrictions against the private employment of labor apply only to common labor at the present time, these restrictions will, as soon as possible, be extended to include skilled labor. In

the meantime, recruiting of skilled labor for war production will be subject to federal regulations now being prepared.

This drastic change in the Nation's labor program has been found necessary in order to protect the employer and the employed, to conserve the labor supply of the communities and to cut down unnecessary and expensive labor turn-over (which, in some cases, is as high as 100% a week), and to increase the production of essentials.

While non-essential industries will be drawn upon to supply the necessary labor for war work, the withdrawal will be conducted on an equitable basis in order to protect the individual employer as much as possible.

Under the operating methods adopted, the country has been divided into thirteen federal districts, each district in charge of a superintendent of the U. S. Employment Service. The States within each district are in turn in charge of a State Director, who has full control of the service within his State.

In each community there is being formed a local community labor board, consisting of a representative of the U. S. Employment Service, a representative of employers and a representative of the employed. This board will have jurisdiction over recruiting and distributing labor in its locality.

A survey of the labor requirements is being made, and in order that each community may be fully protected, rulings have been issued that no labor shall be transported out of any community by the U. S. Employment Service without the approval of the State Director; nor shall any labor be removed by the Service from one state to another without the approval of the U. S. Employment Service at Washington. Every effort will be made to discourage any movements from community to community or state to state by any other service.

This labor program has the approval of all producing Departments of the Government, through the War Labor Policies Board.

It must be understood that farm labor will be protected, for the industrial program distinctly includes special efforts to keep the farmer supplied with labor.

The requirement that unskilled labor must be recruited through the sole agency of the U. S. Employment Service does not at present apply in the following five cases:

- 1—Labor which is not directly or indirectly solicited.
- 2—Labor for the railroads.
- 3—Farm labor—to be recruited in accordance with existing arrangements with Department of Agriculture.
- 4—Labor for non-war work.
- 5—Labor for establishments whose maximum force does not exceed one hundred.

When the survey of labor requirements has been made and the aggregate demand for unskilled labor in war work is found, each State will be assigned a quota, representing the common labor to be drawn from among men engaged in non-essential industries in that State.

These State quotas will in turn be distributed among localities. Within each locality, employers in non-war work, including those who are only partially in war work, will be asked to distribute the local quotas from time to time amongst themselves. Quotas by localities and individuals are to be accepted as readily as they are for Liberty Loan and Red Cross campaigns. This plan of labor quotas is a protection for all communities.

The object is to keep any community from being drained of labor, and to use local supply, as far as possible, for local demand. The situation, however, is such that in certain cases some men may have to be transported over long distances.

You will note from the above outline that this is probably the most drastic action that the Government has taken since putting the National Army draft into effect. The absolute necessity for this program can be seen when it is realized that in Pittsburg, for instance, there are advertisements calling for men to go to Detroit; while in Detroit street cars there are posters asking men to go to Pittsburgh. This same condition is apparent all over the United States and in the consequent shifting of labor a great part of our war effort is dissipated.

THE FOURTH LIBERTY LOAN

The biggest financial achievements of a nation accustomed to big finances, the first three Liberty Loans, are to be eclipsed by the Fourth Liberty Loan. The coming loan will be at least twice as large as the third loan and perhaps larger, dependent upon whether it is finally decided to call for six or for eight **billion dollars**.

It is for statisticians and economists to enlarge upon the extent to which individuals have responded to their country's call and to set forth to what extent history's greatest war chest was furnished by present and what by future generations and to dilate upon direct tax levies and bonded indebtedness.

We, the general patriotic American, only know that **six or eight billion dollars** is needed, and that we will raise it.

Germany's people, faltering at home as their soldiers are faltering beneath Foch's blows in the field, only raised enough in their last loan, we are told, to pay interest on previous war levies. Turkey's last feeble effort before she quit the Central Powers was to raise twelve **million** dollars of a proposed \$32,000,000 loan.

America, summoning its latent financial strength for a task unprecedented in history, will answer with confidence to the call from Washington for whatever sum is set at this time.

Real sacrifice of many comforts will be the means by which many American families swell their purchase of Fourth Liberty Loan bonds. Those whose service flags bear a star of gold will not be inclined to sympathize with those who complain at slight economies in the interest of war funds.

Those who stay at home can make no sacrifice comparable with that which those who go on board ship for overseas duty may be called upon to make at any moment.

Waterfront Needs of San Francisco

By F. M. Dickie

WHEN the early San Franciscans filled in Yerba Buena Cove they thought that they had created a waterfront area sufficient for all times, but during the past decade or two we have begun to realize that the modern acceptance of the term "port" calls for something more than good anchorage ground and plenty of wharf space. Undeniably necessary as these two essentials are, they do not by any means constitute a modern port. Nature has been extremely lavish to the port of San Francisco, and if this community had been forced to create a harbor rather than accept one already at hand, perhaps the necessity of continued effort would have held the interest of the people, who, as it is, have considered the harbor as something which a kind providence had provided and which they need not trouble their heads over.

If we accept it as a truism that the Pacific Ocean is to become the highway for a mighty commerce, a commerce which many sound reasoners argue must become the greatest in the world, then it also stands to reason that, other things being equal, those ports will prosper most which are best fitted to receive and handle the commodities which go to make up the bulk of the freights to be conveyed on the great ocean.

We have been hearing a great deal lately of the splendid progress being made by our northern neighbor, Seattle, as a foreign trade port. Vegetable oil shipments are going largely to the northern city, and the reason for this is that Seattle has been and still is preparing herself to take care of this class of cargo. She has provided for her export grain trade by building a modern elevator. The Puget Sound city has also amply provided for its export lumber trade. Inducements of various kinds have centered the Sound ports as the focus for most of the vast fleet of Japanese steamers engaged in the trans-Pacific carrying trade. A large percentage of Seattle's waterfront business is now being carried on over the municipal sections of her waterfront, for it must be remembered that the metropolis of the Northwest is operating several distinct waterfront units which are separated from each other by stretches of privately-owned docks and terminals, while San Francisco has practically her entire waterfront under single control. It may well be that the stimulating effect of competition between the publicly and privately owned sections of Seattle's waterfront has in a measure helped to bring about the recent remarkable expansion of that city's commerce.

At Portland we find less extensive but still notable efforts to provide for future expansion in the export and import trade. Two modern and well-equipped municipal docks have been constructed and a 1,000,000 bushel grain elevator built. At the same time the Columbia River Bar has been practically eliminated, as far as any deterrent influence upon ocean commerce is concerned.

Los Angeles has also been quietly getting ready to make her bid for some of the coming commerce of the Great Ocean. The southern city set energetically to work to improve not only the harbor itself, but also its surroundings. Several splendid

piers have been constructed, large industrial areas have been developed, permanent and well-equipped warehouses have been built, and, like Seattle, Los Angeles has extensive refrigeration facilities linked up with her waterfront.

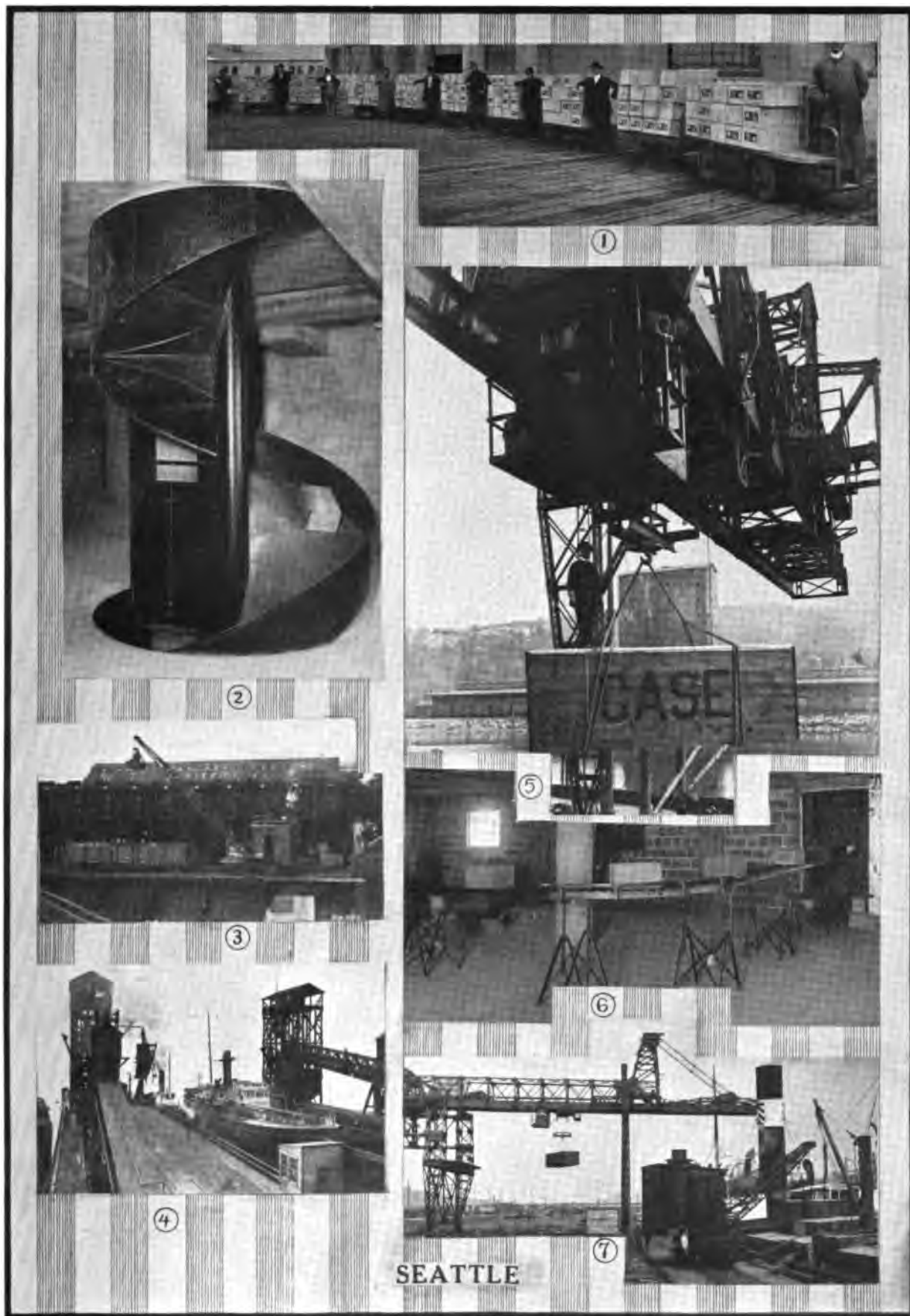
Indeed, it is a fact not to be lost sight of that all the ports cited above have built up large, level land areas adjacent to deep water channels for use as industrial sites and that these sites have been taken up by shipyards, canneries and manufacturing plants almost as quickly as they could be made ready for occupancy.

There has been a great deal of discussion and investigation anent San Francisco waterfront during the past few months, and able reports have been turned in by committees appointed from among the membership of the Chamber of Commerce and other business bodies. The question naturally arises, What is it that the port of San Francisco lacks in comparison with other Pacific Coast ports? Undeniably, this port lacks many things, but on the other hand it possesses many advantages over the cities to the northward. It is the intention of the writer to try and point out some of the things in which San Francisco has fallen short of the requirements for a true world port. In this connection the matter of port charges, dock dues, and in fact all ship and cargo charges that are levied in the interest of harbor works maintenance, will be ignored. Inequalities between different ports in such taxes on shipping and freight are matters of financial adjustment and more attention is now being paid to the division of what we might term "port taxes" between the ship and her cargo than to the total which they together pay. In this article we shall confine ourselves to the merest generalities concerning the operating costs and fixed charges for the terminal equipment of each port as a complete unit.

Freight Transference As It Is

Let us first consider San Francisco's waterfront system merely in the light of an arrangement for the transference of cargo from ship to shore and vice versa, and as nothing else. At the present time this is largely the sole function of our waterfront. Our problem relative to the improvement of waterfront conditions divides itself naturally into two distinct phases—first, what shall we do with our present improved front? and second, what course shall we pursue when we extend its boundaries? As mentioned above, the waterfront of San Francisco as at present constituted consists of a set of piers and bulkhead wharves, most of which are surmounted by one-story transit sheds and have either one or two sets of depressed railway tracks upon them, together with the connecting system of trackage known as the belt railroad. As far as wharves are concerned, our piers are mostly splendid structures and leave little to be desired. The belt railroad as a means of intercommunication between the different piers and a connection with our trans-continental railroad system is good, although it could undoubtedly be made even more useful than it is at present through increasing the present equipment and trackage.

The steamer landing at a San Francisco dock,



Some of the labor saving devices to be found on the waterfront and in the warehouses of Puget Sound's principal port

whether she be a coaster or a vessel engaged in the off-shore trades, is generally fitted with highly efficient ships' tackle, and while similar tackle located on the dock itself might help her out considerably, the time saving possible by this arrangement is necessarily limited. The ship, however fortunate she may be, can only unload a very small portion of her cargo directly into railroad cars and must place the great bulk of her commodities on the deck of the dock to be trucked away, sorted and piled. The reason for this lies in the diversity of the cargo as well as the diversity of its points of ultimate destination, and also to the fact that the landing area covered by ships' tackle is necessarily limited. In short, the ship places freight upon the dock by means of highly efficient hoists and tackle; from the land end of the dock it may be transported away by means of the equally efficient locomotive and train, but in between the ship and the railroad we employ the most obsolete and costly mode of cargo transference in existence—the hand truck.

The evils arising from the use of the hand truck are many, the principal ones being excessive cost for a given result; a heavy wastage of dock space, since freight cannot be tiered except at prohibitive cost, and the inability to keep the ship's tackle working to its full capacity, once all the surrounding floor space is occupied and the men have to make unduly long trips ere they can dump their truck loads.

If the freight is not to be removed from the wharves by railroad cars, the teamsters now take a hand with drays or motor trucks and hundreds of these vehicles may often be seen waiting patiently for a chance to get in upon some crowded dock. These teams and trucks are sometimes left standing all night in line in order to preserve their place, and when it is remembered that all this standing by time has to be paid for it can be readily understood why it is sometimes more expensive to move your goods from the ship to the warehouse than it is to move them from New York to San Francisco via the canal.

This movement from the floor of the dock through to the railway or to the city warehouse is the weak link to the chain of freight movement over San Francisco's waterfront. Unfortunately, in the past, whenever this condition has been brought to the attention of the people, they have responded by providing more chain instead of replacing the weak link with a strong one.

Extension versus Concentration

Is it not true that on each occasion where extensive improvements for San Francisco's waterfront have been undertaken that it has meant the creation of additional wharves and never the outfitting of a dock that could really be considered in the light of a modern terminal? The people of California came to believe that the terms marine freight terminal and wharf were synonymous, and the news that a couple of new modern wharves were going in has always relieved the most of us of all anxiety relative to congestion on the front. As a matter of fact, the San Francisco wharf system as a whole has not been seriously congested with ships for a good many years; some of the structures, in fact, are very little used, while others have often been heavily congested, not with ships, but with cargo. We believe that it can be demonstrated that if our wharves were all properly equipped with machinery for general freight transference purposes, and if we had an adequate system of adjacent warehouses into which freight was transferred from the wharves entirely by machinery, that the present waterfront would handle with the greatest ease at least four times the cargo tonnage which now passes over it.

Harbor Control

If one cares to split hairs, he can easily prove that San Francisco is not a sea port at all, since the boundaries of the city for the major part of its extent stop considerably short of the inboard end of the wharves. The fact that the waterfront is administered and controlled entirely by a State Board of Harbor Commissioners is one that has given rise to much discussion as to the merits of such control as compared to local control by the city government. There is much to be said on both sides of this question. At the time of the formation of the State Harbor Commission it was of distinct advantage to San Francisco to have the credit of the State at her disposal when money was being raised, and the oft-repeated statement that many of the State administrations simply utilized San Francisco's waterfront as a grazing ground for deserving politicians may be offset by the reasonable supposition that many of the city administrations would have done exactly the same thing. But aside from the politicians, there has been one distinct disadvantage of State control, and that is that bond issues for improving the waterfront do not carry the appeal to the general population of the State that they would to San Francisco. Ac-



An ore unloading rig on the Great Lakes. This class of machinery is adaptable to San Francisco conditions only in a limited way, as we do not have the great volume of traffic in heavy bulk freights necessary to pay for the installation and upkeep of such machinery

tion on needed alterations could be secured more readily and more quickly under city control than under State control, and the necessity of falling back upon the State's credit to secure borrowing power has passed.

The act creating the Harbor Commission expressly forbids anyone who would naturally be conversant with harbor matters from becoming a commissioner. A study of the personnel of the many boards which have served as managers of San Francisco's waterfront will reveal the presence of farmers, lawyers, real estate men, grocers and undertakers, but one may look in vain for shipping men, general contractors who have had experience in dock building, civil engineers or terminal experts. The natural result has been that the personnel of one board would just begin to grasp the rudiments of harbor front management when a change of administration would sweep them out of office. Under the circumstances, it is a wonder that the waterfront of San Francisco has been improved as well as it has.

Meager Handling Equipment Now Available

With a splendid wharf system, a practically complete belt railroad, unlimited anchorage area, freedom from violent climatic conditions, dredging problems that are small and easily solved, and with but a six-foot tidal range to contend with, what is it then that the San Francisco waterfront lacks? Considered merely as a transfer platform for freight, our front is devoid of every modern contrivance for avoiding congestion. Some of the steamship companies holding certain sections of the front under lease from the Harbor Commissioners have installed small electric wharf tractors which

haul trailers. These machines have a certain well-defined scope of usefulness and within their limits they will go a long way towards preventing congestion immediately at the points where ship tackles are discharging freight on the wharf, their use permitting a wider spreading of commodities than is economically possible with hand trucks. These surface travellers work under certain handicaps when compared to the monorail system or other means of overhead transference. The surface shifting of freight means the loss of considerable floor space, since numerous runways must be left open in order that the machines can reach every portion of the wharf that is being used to pile freight. Again, the surface machine is not capable of tiering freight whose nature will permit of high piling and hand tiering quickly reaches a height where handling costs become prohibitive. These electric travellers with trailers and adjustable cargo ramps for use in unloading or loading through a vessel's side ports are practically the only aids to handling which have as yet been introduced as far as general freight is concerned. A section of one of the cargo ramps in use at the piers occupied by the Pacific Steamship Company is shown herewith.

The Heavy Weight Problem

If a steamer has to transport heavy machinery, a large boiler or any single piece freight consignment which is too heavy to be handled by her own tackle, she finds it necessary to shift to some privately-owned shear legs, shift back to the original wharf, perhaps, to complete her loading and pay for the use of the shear legs. This is expensive both in time and money, but the steamer is lucky if this is all the incident amounts to. A vessel may be fitting out under the shear legs which are



The customs wharf at a Chilean seaport showing the use of barges and derrick cranes on wharf



In many of the smaller West Coast South American ports both locomotive and derrick cranes will be found at work on the docks

to be used, and in this case the bill of shifting this craft away and back again would also be charged against the freight handled. To overcome this difficulty seems to be easy, but a little thought will show that the problem is an intricate one. If the city constructed a heavy set of shear legs in a certain locality vessels would still have to face the delay and expense of shifting to reach the apparatus. The floating crane would be a much more flexible adjunct to our harbor machinery, but, if self-propelled and self-powered, would represent a high first cost and a very high operating cost in comparison to the revenue which could be derived from its use. If the floating crane, on the other hand, was not self-propelled, but power connections were arranged for it on each of the wharves and the harbor tug towed it wherever its services were required, the operating costs of the apparatus would be cut down to a minimum, but its usefulness would also be curtailed, since it would not be able to work alongside ships in the stream. In any case, however, the floating crane is to be preferred to the shear legs, as it has a wide range of possibilities on harbor work itself, such as pulling piles when wharves are to be reconstructed, etc.

The Ideal Wharf Structure

Much has been written concerning the comparative merits of different types of wharf construction. Roughly speaking, such construction may be divided into three classes—temporary, semi-permanent, and permanent. The wharves at San Francisco are of the temporary and semi-permanent classes. Only the semi-permanent and the permanent types of construction need to be considered here. By semi-permanent wharves are meant structures with a concrete slab or heavy mill construction platform resting either on high-

class creosoted piling, concrete piling or concrete piers. The transit shed would be of either timber or concrete construction. Permanent construction is taken to mean a solid, filled, stone-lined wharf, the initial cost of which under San Francisco Bay conditions would be absolutely prohibitive, or a concrete slab structure resting on heavy cast-iron drums sunk into the mud and filled with piling and concrete. Such a wharf construction would be practically indestructible, and although it would require a heavy initial expenditure the upkeep would be nil.

The advocates of the semi-permanent as opposed to permanent construction, advance the arguments that a wharf will outlive its usefulness in about twenty-five years, since the advance in handling methods and the changes in size and characteristics of cargo carriers would make complete wharf alterations necessary in that space of time. This is entirely true, but if the slips on either side of the wharf are of ample width and the wharf itself is of ample width, it is inconceivable that any change in conditions would make it necessary to change the underwater construction, if it were permanent, either as to its character or its location. The ideal wharf structure then would be a permanent floor and foundation work surmounted by a semi-permanent transit shed of one or two docks in accordance with the character of the traffic to be served.

Such a wharf resting on caissons five feet in diameter protected by cast-iron drums would be practically indestructible, and if provided with a double cargo deck in the transit sheds, a vessel could be unloaded entirely either onto the upper floor or else directly onto cars at the wharf's edge. The lower floor would be merely used as a distributing medium. Trucks, flat cars and every vehicle for outside road conveyance would receive their

loads from overhead, while goods destined for storage would be conveyed directly by overhead conveyers over the marginal street and into the warehouses there constructed for its reception.

What would be the conditions surrounding the use of such a wharf? The answer is that the flexibility of the system would obviate all congestion. In cases where the wharf itself became overcrowded with trucks awaiting freight, these could be diverted to the adjacent warehouse and the overhead conveyors would deliver the freight to them at this point. From the truckage standpoint, the warehouse is much more desirable than the wharf as a shipping point, since, if it be a large structure, all four sides of the building can be worked at once, while a wharf has but a single entrance and exit, and in the case of single deckers the available space for teaming is usually very restricted.

On such a wharf as we are describing, all handling would be by power. Nor should power handling end at the wharf, but its adjoining warehouse system should be fitted similarly so that teams, cars or trucks arriving with consignments or removing goods should have their loads lifted out or dropped on board, as the case might be.

It has been amply proven that vertical travel is cheaper than horizontal travel, at least when vertical travel in both directions is considered and it is the adoption of machinery which will make both horizontal and vertical movement of freight cheap and expeditious, which will change the present arrangements on the San Francisco waterfront from a splendid wharf system to a splendid terminal system. As to just what handling system would best suit the needs of San Francisco there is room for considerable argument, but questions of this kind can be safely left to the harbor engineer and his

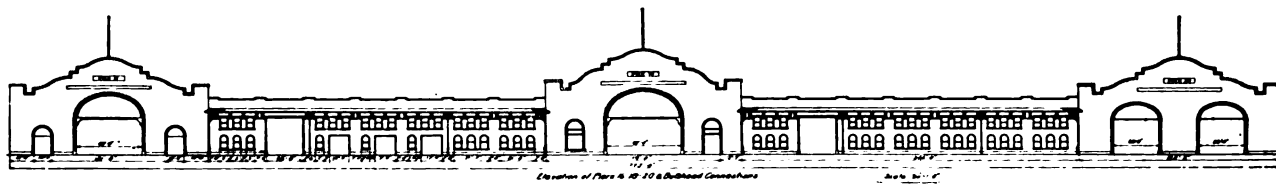
advisors, since they must be conversant with the details of our present difficulties.

One thing is certain, and that is that the cure for the waterfront troubles existing at present lie in the proper utilization of the present wharfage system rather than its extensions. Our wharves are seldom crowded with ships, but a good many of them are often crowded with merchandise. When a single steamer lying at a large wharf can create a congestion by unloading with no aid but her own tackle at a quicker rate than the wharf can be cleared, then there is something decidedly wrong at the shore end of the transfer. Our harbor facilities are not alone in their shortcomings and considerable factors in the delay at wharves may be laid at the door of freight car designers. Why do American box cars have to be loaded through side doors? It would be a simple matter to have the roof of the car removable so that a crane could pick it off, load the car in a few minutes and place the roof on again and the roof could be so designed that its removability would detract in no way from the structural strength of the upper part of the box car.

The present Board of State Harbor Commissioners is fully alive to the necessity for cargo handling facilities on our wharves and in conjunction with the harbor engineer that body is working out an extensive scheme of improvements along constructive lines. Cargo masts with electric hoists to work in conjunction with the regular ship's tackle are to be erected on three of the piers and this will materially aid in the actual loading and unloading of vessels and when this end of the cargo movement is speeded up the need for mechanical handling on the wharves themselves will be more apparent than ever. Double



A typical Pacific Coast dock on which there has not been left enough room outside of the transit shed



Front elevation of the wharf structure. It will be noted that the entrance and egress space for teams and trucks is somewhat limited

South San Francisco thus securing many more hundreds of acres, in fact the possibility of such development to the southward is practically unlimited.

While such improvement work as that which has been outlined by the San Francisco Civic League and others may not be carried out in the near future owing to the desire of the Government to conserve capital, still such improvements might well be called to a large extent war improvements and it is surely necessary for every port on the Pacific Coast to do its utmost towards preparation for making the great commercial use of the Pacific, which has already given our ports a sure indication of its future growth, as far as possible American. To do this we must utilize to the fullest extent with waterfront with which nature has so bountifully supplied us.

In regard to the development of this southern waterfront area, Mr. C. E. Grunsky, who has been carrying out the preliminary estimates for the creation of new land for industrial sites at the request of the Civic League, a local body of public spirited citizens, has made the following statement:

That there was a lack of vision and foresight when the rectangular system of streets was laid out in the hill districts of certain business and residence sections of San Francisco, as also in the adopted policy of establishing street grades in close conformity with the natural surface of the ground, has often called forth comment. The prospective requirement of industries, of commerce and even

of ordinary intercommunication between different parts of the city received apparently but scant consideration.

This is a large subject and only alluded to here because the embarrassing result of the lack of vision is again to the fore as the need for larger development of the city's waterfront becomes pressing.

The progress of extending improvements over the low flats along Mission creek was slow and unsatisfactory, largely due to a lack of proper material with which to make the necessary fill.

Rincon Hill, which could have afforded much material, after more than a quarter of a century of agitation for its removal is still an obstacle in the way of business interests.

And now attention is seriously directed to the barrier imposed to development of industrial areas by the long, narrow Hunter's Point ridge, which rises to a maximum height of about 260 feet, and by the hills within the city on the bay front near the county line.

At large expenses and with great difficulty the owners of the mud flats along Islais creek are making these flats available for commerce and for manufacturing establishments. Their lands are flanked by high hills, which should be graded to reasonable slopes, but which, by reason of ownership in small areas and the difficulty, yes, impossibility of securing grade changes can not provide the material which would have been available at flatter slopes and with which filling to higher ele-



It has often been said, "Why have an expensive crane for lifting heavy weights when it might not be used more than once a month?" Why have a fireboat when a serious waterfront fire may not occur for ten years? If one is for fire insurance, the other is for freight insurance

September



the unusual natural harbor... were early recognized and... Had they been less... initiative and effort... and hold the business... of San Francisco in the... commerce would not

the map will show that San Francisco is a perfect outlet toward the... of practically level water... within the city and... South San Francisco

the success of the project for... the Hunter's Point district... this about, it not only... the taking of a... the ultimate development of the... port. An accident... the project should... necessary delay.

the town Hunter's Point... the city boundary... material could... that lie both to the... Point goes without

and economic aspect... features must be carefully... a community... owners of property... burdened... which are involved... time. The large... water front, much of... the waters of the bay, will... above the water... be reclaimed with



Port of what congestion. Teams waiting their chance to get to the central pier in the picture, while it will be noted that the other piers on the right are practically idle



In studying this structure it will be noted that there are a great many doors for shifting cargo into the transit shed, but on the other hand there is only one way of getting it out

the material obtained by cutting down the hills is of such breadth, extending as it does inland more than a mile at some points, that much of its surface should be raised considerably higher than its water front margin. How high the fill on this land should be made is one of the questions to be answered by the engineer who will, in his final conclusion, so adjust the cut into the hill area and the fill upon the tide marsh and into the bay that, while fulfilling the main requirement of attaining fair street gradients, the aggregate amount of excavation and the ultimate cost will be kept at a minimum.

As an interesting fact it may be noted in this connection that the removal of the Hunter's Point ridge easterly from Railroad avenue will provide sufficient material for filling in the low areas within San Francisco, leaving an abundance of material from the more southerly hills for the flats beyond the county line.

In working out such a project as this, county boundaries should be ignored. San Francisco and San Mateo, the property owners and the State should all work together, confident that a satisfactory result can be achieved.

When the work is done, manufacturing establishments will avail themselves of the facilities offered to the extent that they are as good or better than found elsewhere. Commerce will do likewise, and the foundation will have been laid for the larger general development which throughout the bay region is bound to keep pace with the growth and prosperity of the State and of the Nation so long as we but do our share to provide the facilities which are needed.

Hindsight is much more prevalent in this world than foresight and it is easy to look back over the development of San Francisco's present waterfront and see where grave errors of judgment were made. It was an entirely different matter for those who built up the present waterfront to look forward and gauge clearly the requirements of the future. As to what our waterfront possesses we are proud to compare it with similar facilities elsewhere while those things we lack are the outgrowth of unavoidable or unforeseen circumstances. The present Board of Harbor Commissioners are working wholeheartedly with the city's shipowners and shippers to improve the present freight handling conditions and great developments along these lines are confidently looked forward to.



This illustrates a case where berthing space is insufficient and the vessel in the center has little chance to load or discharge until one of the others is through

The Western Shipbuilder

By Charles Piez, Vice-President Emergency Fleet Corporation

WHILE en route to the East from his recent visit to the Pacific Coast, Charles Piez, vice president of the Emergency Fleet Corporation, issued the following interesting statement:

"The Pacific Coast is a land of superlative superlatives of climate, of scenery, of energy and enthusiasm and latterly of ship construction. For the West Coast was awarded all six pennants for ship construction in the month of May and all of its yards rank so high in rate of production that the competition during the next three months, at least, will be largely between the yards of this section. Climate that presents favorable conditions for out-of-door work all the year round is, of course, a factor, and a considerable factor, in ship output, but in justice to the eastern and southern yards it must be said that the West owes its present supremacy not so much to the climate and the enterprise and energy of its people as it does to the fact that a considerable number of its yards were established going concerns when the Fleet Corporation began operations. Skinner & Eddy, Bethlehem, Moore and Scott, Columbia River, Northwest Steel, Ames, Duthie, and the Seattle Construction Yard were all well under way before even the plans had been devolved for such large yards as the Federal, Submarine Boat, Bristol and Hog Island. When these yards get into full swing, which should be the case before another 90 days, then the question of whether Western climate and energy can surpass the resources of the East in actual ship output will be given a fair test. But miracles have been accomplished even in the new yards on the Pacific Coast.

"The yard of the Los Angeles Shipbuilding Company is a marvel of speedy accomplishment. In both yard and ship construction the same can be said of the Western Pipe and Steel Company's yard, and the yard of the Todd Company at Tacoma. Even the newer yards, like those of the Southwestern Shipbuilding Company at San Pedro, the Pacific Coast Shipbuilding Company at Bay Point, and the Standifer Company at Vancouver, Wash., deserve high commendation for excellency of design and celerity of construction.

Applies to Both Wood and Steel

"The West impresses one as the land of accomplishment in shipbuilding and this applies to both wood and steel construction. If the wood ship survives, it will survive because of the timber resource and the enterprise and energy of the West. The wood shipyards are real yards well laid out, well equipped, well managed and well manned, and the variety of designs developed by the West Coast shipbuilder bears testimony to the ingenuity and invention of the Western people.

"We have spoken of wood ship construction as a lost, or at least a suspended, art, but the West has always found some place for the larger wood craft, and wood shipbuilding on the Pacific Coast has been in a model way an active industry for many years. It is not to be wondered at that the first delivery should be registered by the West Coast and that our largest hope for this kind of craft centers around this favored section, for a section is indeed favorable that within a radius

of 10 or 20 miles can cut the trees, saw the timber and build the ships without outside aid for timber.

"Though the West has accomplished much, her ambition is insatiable. There is not a shipyard that is not prepared to expand. There is not a community with a stretch of dater front that is not eager to rival the Clyde. Everywhere there is intense interest and enthusiasm in shipbuilding. It has gripped the popular imagination, and it has offered this vast coast line an opportunity for industrial development, an opportunity that is being embraced with customary Western vigor. There exists there no fear that shipbuilding supremacy will ever be wrested from its hands. There is nothing but pride in vast performance, confidence that results in future will set a new mark in ship production, and it is this very confidence, backed by the conviction that shipbuilding has opened up a new industrial era, that will make the West Coast a worthy and dangerous foe to the Eastern yards.

Ovation Reflects Ambition

"The splendid ovation given Mr. Schwab and his party, in addition to being a high personal tribute, did reflect the ambition of the West to become the world's leading shipbuilders. Mr. Schwab brought the opportunity, and the West responded generously and whole heartedly, as only the West can.

"Los Angeles, San Francisco, Portland, Tacoma and Seattle were ordered to add to existing facilities, and organized labor, itself, was interested in the expansion. It was at one of the largest and most enthusiastic meetings of our whole trip that a prominent leader of organized labor, after a most patriotic and generous introduction, stated that labor not only was interested in the expansion of the yards, but in the contracts for ships that were to be placed. He recognized that high wages could be maintained only if there was abundant opportunity for employment, and he cautioned his men to keep their heads and not to spoil the best chance they had ever had in their lives.

"This same advice can be given to the business interests of one or two of the shipbuilding communities, for there is just a tendency to overcapitalize opportunity, and thus to destroy the best chance for industrial development which the West coast has ever had. Labor that does not exist cannot be created by bidding up wages to prohibitive figures. After all, the output of the entire community is what really counts, and this output is maintained and increased by husbanding resources of both labor and material and using them for the common good. The old conditions of competition must no longer be permitted to exist in the shipyards if we are to win out. Every advantage in method, or facilities, or design owned or controlled by one yard must be placed unselfishly at the disposal of all. That this truth is recognized and acted on is shown by the kind of information and data gathered and distributed among members of the Northwestern Shipbuilders' Association, and was exemplified, too, by the generous response made by Joe Tynan, General Manager of the Bethlehem Shipbuilding Corporation, when, in answer to my request to submit a com-



Launch of the "West Hobomac" from the Skinner & Eddy Corporation, Plant Number One, and Mrs. H. G. Seaborn, wife of the Vice-President of the Company, who sponsored the big vessel
Photo Bushnell, Seattle

Launch of the West Hobomac

On July 27th the Skinner and Eddy plant No. 1 launched its twenty-first steamer, the 8,800-ton deadweight freighter, "West Hobomac." The keel of this vessel was laid on May 29th, forty-nine working days lapsing before her launch. In this connection it is interesting to note that the Skin-

plete set of oil tanker drawings which his company had developed to two other yards to whom we had just awarded contracts for this class of vessel he said, 'sure, and tell them they need not make any new patterns. They can use ours.'

"There is the spirit that is quickly developing our shipbuilding industry to meet our national needs, the spirit that forgets temporarily the advantage over a competitor and makes everything subordinate to the nation's necessity. It is this spirit of generous co-operation, of recognition of the new order of things that makes us confident of success.

ner and Eddy plant No. 1 has been remarkably consistent in the time occupied by each hull on the ways. Taking the last eight ships launched from this plant we find the following construction records; the West Lianga 55 days, West Alsek 58 days, West Apaum 55 days, West Cohas 55 days, West Ekonk 57 days, West Gambo 59 days, West Gotomska 50 days and West Hobomac in 49 days.

The launching of the West Hobomac closed Skinner and Eddy's launching program for the month of July, the firm being credited with three 8,800 tonners launched during that month from their original yard and two 7,500 tonners from the plant of the Seattle Construction and Dry Dock Company.

The West Hobomac was christened by Mrs. Henry G. Seaborn, wife of H. G. Seaborn, vice-president of the Skinner and Eddy Shipbuilding Corporation. The launching was an unusually successful one, and was witnessed by a bevy of distinguished guests.

Petroleum Distillates Suitable for Diesel and Surface-Ignition Engine Fuel

By Philip Lane Scott

WHAT is fuel oil?

What petroleum products can be used for fuel in Diesel and surface-ignition engines? We have considered the first question to some extent in purchasing fuel oil (which varies rather widely in quality), but we seldom consider the second, though it is far the more important.

Fuel oil is, under most divisions of distillation, the third primary fraction. The general division, as commonly practiced in Germany, where the supply of petroleum is very limited and must be used to the best advantage, gives the most profitable amounts of each distillate. The temperatures are usually a little lower for each period than in common American practice, since the heavier fractions find more use there than in this country and the proportions of the fractions are, in this way, better divided against the demand.

It is possible to secure as high as 10 per cent of fuel oil from a good grade of crude oil. Our average production is about 4 per cent. The production of crude oil in the United States is now about 300,000,000 barrels a year and we obtain about 12,000,000 barrels of fuel oil from this yield.

Twenty per cent of the crude petroleum is suitable, however, for use in Diesel and surface-ignition engines. This amounts to 60,000,000 barrels, which represents 42,000,000,000 horsepower hours of Diesel engine service.

A good fuel oil has the following characteristics: Its per cent of carbon is 86.2 and of hydrogen 12.65. Its lower heating value is from 9,800 to 10,500 calories per kilogram (17,500 to 19,000 thermal units per pound), average about 10,000 cal./kg. (18,000 T U./lb.). It requires 11 cubic meters of air for complete combustion of one kilogram (175 cu. ft. per lb.). Its flash point is usually about 53 degrees C. (127 degrees F.), but it runs as high as 100 degrees C. (210 degrees F.).

It is a mixture of the heavier members of the methane and naphtha hydrocarbons (methane group C_nH_{2n+2} —naphtha group C_nH_n). In the American oils the methane group predominates. The specific gravity of these oils is about 0.860.

For the proper combustion of fuel oil certain conditions are necessary. The temperature must not be too high; no preheating of either oil or air is necessary. Glowing points in the cylinder are to be especially avoided, for these will induce explosive combustion, which is not desirable—distinctly undesirable—in the Diesel engine. A hot valve or heated oil or air will result in rapid accumulation of soot or coke in the valve. The angle of advance of injection (point of opening fuel valve before inner dead center) must be rather small to prevent pre-ignition. The angle runs from 1 to 15 degrees of the crank circle, according to the speed of the engine, the compression pressure and the type of injection. Not so much excess air is required as in the case of residue and coal distillate oils. Twenty-five per cent should prove sufficient, although from 15 to 50 per cent is used in different engines. For ordinary use the distillation should be carried out thoroughly, because an appreciable amount of the lighter fractions will

cause too explosive a combustion. If it is desired to use oils containing these lighter fractions, consideration must be given to the fact and the compression reduced accordingly. The specific weight and flash point are good measures of the character of the oil in this respect.

The possible power production from Diesel and surface-ignition engines can be increased in total, by using the lower grade fuels. As the specific gravity, flash point and viscosity of the oils increase, certain changes are necessary in the engine to secure good results. In general, as these factors increase, the compression and the temperature in the cylinder must be increased and for very viscous oils preheating is necessary. The higher the asphalt or tar content the oftener must the pistons be examined and cleaned. Conservative specifications for oils suitable for fuel follow. These are taken from Technical Paper, No. 157, Department of the Interior, Bureau of Mines, and notes have been made where actual practice upholds an increase in the latitude.

Solidifying Point and Fluidity

The oil should be mobile at 32 degrees F.

If it is not, or if it is extremely viscous, or contains a considerable amount of asphalt or paraffin, a preheater must be used. If very heavy oils are used the engine should be first run on a more fluid fuel and the heavy oil introduced only after the engine is hot and running well. This process should be reversed when shutting down, and the heavy oil should be washed out of the engine valves and pipes with a lighter oil, the engine being run for a short time on one of these lighter oils before it is allowed to become cold. (Note: Warming the injection air is sometimes useful for oils with a high asphalt content.)

Tar Content

An oil should not contain more than 0.4 per cent of material insoluble in xylene, as a larger proportion of insoluble material will tend to form coke in the cylinders. Ten grams of the sample mixed with ten cubic centimeters of xylene, shaken and filtered, should not show more than 0.04 gram increase on the filter. (Note: The higher the compression and the oftener the pistons are cleaned, the more insoluble material is permissible, but no definite figure can be given for an extreme limit.)

Coke Residue

The residue on coking should not be greater than 3 per cent. (Note: An increase is permissible, as noted under Tar Content.)

Free Carbon

There should not be more than trace of free carbon in the oil, as free carbon tends to clog the valves and to deposit on the surface of the cylinders.

Volatility

At least 80 per cent of the oil should distill over at 350 degrees C.; for oil leaving more than 20 per cent residue at this temperature will show a large carbon content by coking. (Note: Latitude is permissible, as noted under Coke Residue. Considerable progress has been made recently in burning residue oils, but high compressions were used and combustion conditions were favorable.)

Distillation

Heavy oils and residues, though they may be successfully burned in a heavy-oil engine, should properly be distilled (not refined) before using, because it is cheaper to prepare the oil before introducing it into the engine than it is to dismantle the engine or a part of it for cleaning. (Note: Primary Californian, Mexican and Russian residues have been burned without too excessive deposit in some high compression Diesel engines, but it is unquestionably better with these oils to subject them to distillation, even at temperatures as high as 450 degrees C. This is especially true for surface-ignition engines, since the temperature of the air is considerably lower and there is always a tendency for particles of the oil to come into contact with the hot surfaces and coke.)

Flash Point

The flash point should be between 60 and 100 degrees C. (Abel-Pensky closed tester). A small proportion of oil of low flash point is necessary to secure ignition. (Note: Mixed fuels, containing a small proportion of low flash point oils, do not operate so smoothly as an unmixed oil of moderate flash point. It is better to raise the compression than to add low flash point fuels.)

Specific Gravity

The specific gravity, although in itself of little significance, should not be more than 0.920, because when greater the large proportion of residual matter would give trouble in the engine. In general, the boiling point or distilling proportion is of more significance. (Note: For oils coming from the same locality the specific gravity is a good comparative measure, but for oils coming from different fields the flash point and distilling proportion should be considered.)

Calorific Value

The heating value should not be less than 9,000 calories per kilogram and hydrogen content not less than 10 per cent, as lower values are approaching the values of pure carbon and would give poor combustion.

Sulphur Content

The sulphur content should not be more than 0.75 per cent because a greater proportion attacks the cylinder walls and tends to pit them, making them rough. Brass, zinc and copper are to be avoided in surfaces exposed to combustion. Nickel steel seems to be the most resistant material. (Note: The corrosive action due to sulphur in the oil does not take place unless water vapor is present. Dry steam, a product of combustion, will not aid the reaction, and therefore, if the exhaust gasses are blown from the cylinder when shutting down, before the steam has an appreciable chance to condense, this action will be reduced. It is quite active in the exhaust headers, however, because of the condensation, and therefore cast iron is the only suitable material.)

Acid and Alkaline Content

The oil should contain no free ammonia, alkalis or mineral acids, because of their pitting effect on the surfaces exposed to combustion.

Ash Content

The oil should not contain more than 0.05 per cent of non-combustible matter, because such matter tends to hasten carbonization in the cylinder and to prevent combustion.

Water Content

The water content should not be greater than 1

per cent. One per cent of water reduces the calorific value by about one per cent. Moreover, to raise the temperature of 1 gm. of water from room temperature, say, 30 degrees to 100 degrees C., requires 70 calories, and to evaporate 1 gm. of water at 100 degrees to steam at 100 degrees requires 536 calories. Hence 1 gm. of water causes a total destruction of $536 + 70 = 606$ calories; and to raise the temperature of the steam to that of the cylinder requires still more heat.

The absorption of heat in raising the temperature of the steam is partially compensated by the action of the steam in expanding and performing work on the piston. In short, 1 per cent water in the fuel itself will cause a loss of approximately 1.06 per cent in the calorific value of the fuel. It must also be remembered that a drop of water suddenly generated into steam within the spray itself at the instant of ignition may lower its temperature and prevent ignition.

Resin Content

The resin content should be low, as resins have a tendency to carbonize readily and would tend to coke in the cylinders.

Creosote Content

Oils containing creosote up to 12 per cent, though causing smoke, can be burned. A higher percentage of creosote gives trouble by coking. (Note: Again it is true that the high compression makes greater latitude possible.)

Paraffin Content

A paraffin content of 15 per cent will give some trouble. An oil containing a still higher percentage of paraffin, because of the large quantity of oxygen necessary for complete combustion, will burn with more difficulty. (Note: By raising the compression and increasing the scavenging pressure, if possible, a high paraffin content can be taken care of successfully.)

Asphaltum Content

The heavy-oil engine, as far as the use of asphaltum oils is concerned, is still in its experimental stage; but it can fairly be assumed that when the mechanical difficulties are surmounted, it will be practicable to burn any fuel oil containing asphaltum that is sufficiently fluid to flow, providing the oil be free from solid matter and water. An oil containing 21 per cent asphaltum has been successfully used. (Note: This experimental stage can be said to have passed. The writer operated an engine which burned an oil having 45 per cent asphaltum.)

Atomization

Fine atomization is essential, for if the fuel enters the cylinder in drops of appreciable size, which can burn only from their surfaces, it will not have time to complete combustion. The fuel will consequently strike the sides of the cylinder and the piston head and there carbonize. (Note: This point will be briefly touched in a succeeding article. Much time can be profitably devoted to its study. A drop of oil burns on its surface only and the products of combustion cling around the unburned nucleus. (This means that the drop must be almost infinitesimal in size. Further, the greatest possible area of spray must be exposed to the air. This last point is almost universally overlooked.)

Commercial Oils Suitable for Fuel in Diesel and Surface-Ignition Engines

Benzines (expensive and require a very low compression).

Specific gravity 0.700-0.755.
 Distilling between 140° and 160° C.
 Kerosenes (some are expensive, compression fairly low.
 Specific gravity 0.85-0.95.
 Distilling between 150° and 300° C.
 "Solar," gas or fuel oil.
 Specific gravity 0.800-0.930.
 Distilling between 300° and 360° C.
 Lima fuel oils, "eagle" oil, gas oil, tar distillates, Austrian and Russian residues.
 Specific gravity 0.943-0.952.
 Distilling 350° and 450° C.
 Paraffine oil residues.
 Specific gravity 0.860-0.890.
 Californian and Texas fuel oils.
 Specific gravity 0.840-0.900.
 Asphaltum oils containing as high as 45 per cent asphaltum have been used.
 Mexican fuel oils.
 Specific gravity 0.878.
 Mexican residues. These are usually high in asphaltum.

Vegetable oils.

Cottonseed, specific gravity 0.913-0.920.
 Peanut, specific gravity 0.916-0.920.
 Coconut, specific gravity 0.925.
 Castor oil, specific gravity 0.960-0.967.
 Palm oil, specific gravity 0.850-0.860.

These are usually expensive, but may be used in emergencies and peculiar cases.

Animal oils, such as lard oil, can be used, but are expensive and can only be considered in an emergency.

These points answer the second question with which we began.

Owners and those contemplating the purchase of either heavy oil engines or steam engines should get into touch with oil men and the engine builders, with a view to investigating the possibilities of power production from low-grade and cheap fuels.

We must use the available fuel more economically. We have great plenty of oil. We have only to use good sense in the method of converting it into work.

Marine Repairs in a Railroad Shop

By Frank A. Stanley

Member American Society of Mechanical Engineers; Member American Institute of Mining Engineers

THE shops of the Southern Pacific Company, at Sacramento, occupy an unique position among Pacific Coast plants in that they accomplish the repairs of marine equipment in addition to overhauling and building locomotives and cars. It may be said in fact that the operations involved in the upkeep of ferry boats, river steamers, and other floating equipment constitute a very important part of the activities of the plant referred to.

As readers are aware, the types of engines used on much of this equipment have very long stroke cylinders and the reboring of such parts forms an interesting problem in shop practice. There have been two methods followed at the Sacramento shops; one consisting in placing the cylinder horizontally in a big lathe and operating the boring bar and head between the lathe centers; the other involving the setting up of the cylinder on one end and placing a special boring rig in vertical position to operate the boring head from top to bottom of the cylinder casting.



Fig. 1. Crank shaft for steamer "Alameda," set up in lathe ready for turning of the pin

Both methods have their advantages and of course certain disadvantages as compared with one another. With the very long cylinders the placing in horizontal position in the lathe means that the work must be set up with care and judgment to avoid possibility of sag and corresponding distortion during the boring process, and at the same time some attention must be given to the clearing of chips from the several cutters in the boring head. With the vertical method of boring, considerable more difficulty is found in setting up the portable bar in the first place than is experienced in placing a similar piece of apparatus between the centers of the big lathe. Also it is a more serious matter to adjust the bar central with the work bore and support it in that location as special spiders and housings are required for the purpose while in the lathe the fixed centers of the machine give immediate facilities for such purposes. But the vertical method has at least the advantage that the cylinder to be bored, or rebored, as the case may be, stands in the best possible position to retain its original condition without likelihood of becoming sprung or deformed because of its own weight; with the result consequently that its bore will be correspondingly accurate when the casting is returned to place in the boat. Also the use of the special vertical boring apparatus eliminates the necessity of tying up a very expensive machine tool during the period when the cylinder boring operation is being carried out.

But, as stated before, both methods have been used here as elsewhere, extensively, and both have given entirely satisfactory results because attention has been given to certain features of practice as pointed out, and the selection of the specific method at any given time for the boring of some individual cylinder depends upon shop conditions at the moment, and on the particular piece of ma-



Fig. 2. Showing lathe head and foot stock raised for increased swing necessary for turning crank shaft

chine apparatus that happens to be available at the time when the job is required. It is in this connection sometimes entirely possible to determine which tool shall be used for a given repair job and then put the job through as soon as the machine is available for the purpose. On the other hand it is more apt to be the case that the repair work must be attended to immediately and the machine tool or special apparatus available at the moment is the one that must be utilized even though in some respect it might be more desirable could the job be deferred for a time until certain other shop equipment could be made use of.

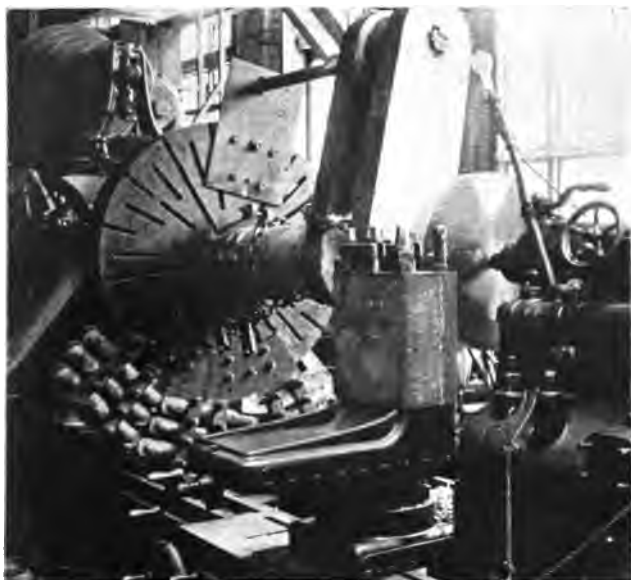


Fig. 5. Turning the crank shaft

The present article illustrates a few of the interesting steps in the finishing of a new crank shaft for a steamer, and shows certain operations on the wheel shaft itself.

Referring to Fig. 1 herewith, this represents the new crank shaft of cast steel, set up in the big engine lathe which as seen in Fig. 2 has been jacked up on blocks for head and foot stocks to give an increased swing of at least four feet in addition to the regular swing over the bed. These views show the shaft set for the turning of the crank pin which is accomplished with a special machine which is split in halves and adapted to be slipped over the big crank pin and so act as a turning medium for finishing the pin to required diameter.

From the detail of the crank shaft it will be seen that the main bearings and pin are 16 inches in diameter; the throw from axis of shaft to center of crank pin 48 inches; the width between webs 10 inches; the length over all 10 feet $\frac{3}{4}$ inch. The estimated weight of the finished crank shaft and crank is 14,000 lbs.

Referring now to Fig. 4, this photograph shows the crank shaft blocked up in the lathe and located therein by the centers of the lathe which enter liberal center holes counter sunk in the ends of the steel casting. The crank pin is located at a convenient height by means of a steel bar which is slipped through the hole in the pin and rested at its ends upon the cross blocking below.

The turning machine for the pin is, as stated, in halves to allow for placing over the work after which it is closed up and ready for operation by

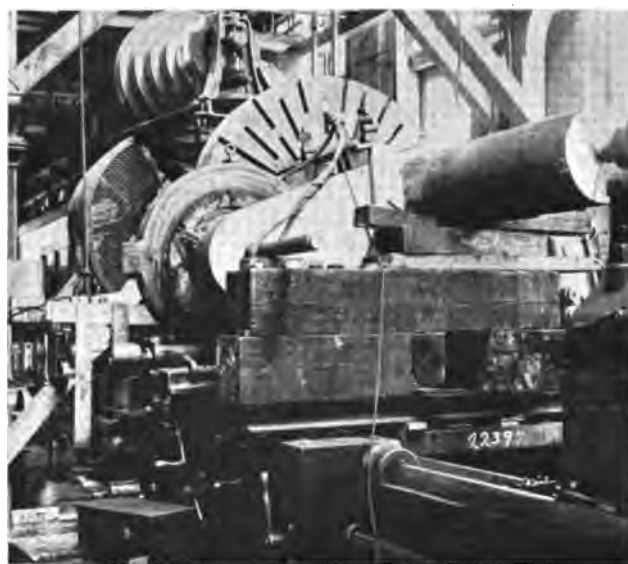


Fig. 4. The special rig for turning the crank pin

means of the electric motor shown on the floor to the left of the head of the lathe.

The motor is connected by a belt with a jack shaft erected at the left of the pin turning outfit and this in turn is belted to a small pulley on a worm shaft at the front of the turning apparatus. The worm shaft serves to rotate a big worm ring which is formed on the outside of the device which carries the pin turning tools and thus motion is imparted from the motor to the turning outfit.

The tools are secured in the face of a ring which forms a chuck like member, and which is rotated as mentioned, by worm teeth on the periphery en-



Fig. 6. Planing the crank shaft on the draw out shaper



Fig. 7. Cutting keyways in the wheel shaft

gaged by the worm on the driving shaft extending to the front. The machine with the cutting tools is thus driven at the rate of four revolutions per minute, the tool being fed sidewise in its holder for taking the cut, at the rate of 1-32 inch per revolution about the crank pin.

This means for the pin with its 10 inch face that the tool swings around the work 10 times 32 or 320 times to complete one pass across the surface of the pin. Four cuts were required in all to complete the turning from the rough steel casting to the finished pin. Three of these may be considered as roughing cuts and the bulk of the metal to come off was divided fairly uniformly between them. The finishing cut removed say 1-64 inch on a side. The total amount of metal turned off was about $1\frac{1}{4}$ inch deep over all.

The actual time taken for handling the job described was about four working days, of which two were required for rigging and setting up and

getting ready for machining operations. It will be understood that on account of the nature of the work there was necessarily a very limited amount of space about the turning device and the pin itself so that the cutting tools were held down to rather short dimensions. And, too, with the narrow limits for the application of the apparatus to the pin between the webs, the housing for the rotating chuck or tool head, it also restricted as to width and with the limiting depth necessitates the use of a fairly slow rate of feed during the cutting operation. The work shows remarkably good results and the time required under the circumstances formed an exceedingly good record.

The turning of the main bearings and the crank as a whole is illustrated by Fig. 5 which shows the application of liberal counterweights to the lathe face plate to offset the weight of the throws and pin.

After the crank shaft was removed from the lathe it was planed up on the webs by placing it in the draw-cut shaper Fig. 6 where the shaping tool will be seen in operation on the rounded end of one of the webs. The tool is shown at the end of the extended shaper ram which as the name indicates cuts on the draw stroke or return stroke of the ram. This type of machine is a very useful affair in any shop, particularly where a variety of work must be handled requiring different operations and this cannot be better illustrated than by the photo Fig. 7 which shows the same type of tool equipped with a milling cutter for cutting the key ways in the wheel shaft, a detail of which is given in Fig. 3. The key cuts are 2 inches wide and extend for a length of about 13 feet. The draw cut shaper ram is fitted with a rotating spindle adapted to receive a milling cutter and in this case the machine is particularly convenient for the long heavy undertaking illustrated.

“Pyrometers---Past, Present and Future”---In Relation to Heat Treating and Annealing

By Richard P. Brown,
President The Brown Instrument Company

AS far as we know, the Ancients, who baked excellent bricks and forged iron in their crude way, made use of a form of pyrometer used today with ever diminishing success, the “eye.” Doubtless the Egyptian looked into a kiln and guessed the fire must be about right. He probably wasn’t off more than a couple of hundred degrees, and very probably he guessed the temperature a great deal more accurately than some so-called pyrometers of later date. His eye was also much clearer than the eye of some of the modern furnace men who see almost any temperature in a furnace, depending on the amount of sleep they have had the night before.

One of the early devices to measure temperature was the mercurial thermometer, with which every one is familiar. Mercury thermometers for temperatures up to 600 degrees Fahr. have a vacuum above the mercury column. As mercury boils at 674 degrees Fahr., thermometers graduated above this must have the mercury column under pressure to prevent boiling. A mercury thermometer graduated to 1000 degrees F. has 200 pounds pressure

above the mercury column. This is about the limit for a mercury thermometer, as the glass tubing will soften at temperatures above this, and the pressure necessary to prevent boiling becomes excessive.

The first mechanical pyrometers operated through the difference in expansion of iron and brass. An iron tube containing a brass rod projected into a furnace, and these were mechanically connected to a multiplying movement which caused the pointer to pass around a dial. The difference in expansion of about one-eighth inch was sufficient to move the pointer up 800 degrees Fahr. This form of pyrometer has a tendency to change in its reading with time and temperature, due to the co-efficient of expansion of the metals changing through continuous heating and cooling. This occasions frequent readjustments of the pointer to compensate for this error.

The metallic expansion pyrometer was the most largely used in heat treating, glass annealing and blast furnaces during the period between 1860 and

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Mobilizing Our Man Power To Fill Our Merchant Ships

By Edward N. Hurley,
Chairman United States Shipping Board

WITH something like 25,000,000 tons of merchant shipping to be employed inside of two years, the United States Shipping Board feels that it is none too early to look around for cargoes, both in this country and abroad. With the task of building the ships in charge of the Emergency Fleet Corporation, under the leadership of Charles M. Schwab, this function of the United States Shipping Board begins to attain prominence—and that is what the shipping board was originally created for by Congress.

Twenty-five million tons is a lot of shipping. In one voyage these ships would carry all the live stock, dressed meats, packing-house products, poultry, game, fish, wool, hides, and leather carried on our railroads in one year. In less than five trips they would carry our whole yearly railroad haul of grain, flour, cotton, hay, fruit, vegetables, and other farm products; in three and one-half trips all our lumber; in seven trips all our manufactured goods; in sixteen trips all our coal and coke. The total tonnage hauled on our railroads is about 1,200,000,000 tons.

So, amid all his splendid effort in producing equipment to win the war, the American manufacturer must be asked to take thought for tomorrow and think in terms of shipping and foreign trade. This might appear like a distraction now—something which will take the attention from the supreme duty of winning the war. But far from being a distraction, it fits in with war production and war psychology. While our factories and factory employees are building war material today, they are also building foreign trade, if we can only see things whole and make one factor work with another.

When the business man turns his attention to export trade he looks abroad and thinks of foreign customers. But foreign trade actually begins in his own factory. He looks abroad and studies such factors as ocean freights, foreign exchange, export packing, and international salesmanship. If he would look into his own factory first, and study factors close at hand, such as labor turnover, wages, manufacturing costs and efficiency, he would be laying solid foundations for export trade.

In a recent study of factors that make successful, lasting foreign trade, Prof. Taussig places first of all the element of manufacturing "effectiveness," as he calls it, which he defines as a combination of capital, labor, invention, salesmanship, and transportation, all working together under first-rate business leadership, to make goods capable of holding markets in competition with the products of other nations. These elements of effectiveness are largely right at hand in our factories—it is not necessary to send anybody abroad to find them. And as an illustration of how nations make mistakes in trying to build foreign trade at the other end, Prof. Taussig shows that real effectiveness in manufacturing almost invariably holds its own against artificial devices for building foreign trade, such as export bounties, special railroad rates on export shipments, cut prices, discriminatory tariffs, etc.

With the bugaboo of cheap foreign labor haunting us in former years, we got into the way of thinking that export trade necessitated some lowering of wages and American living standards. Probably that was crooked thinking before the war. Certainly it is crooked thinking now, for the war is bringing other nations closer to our American standards of wages and living.

True development of foreign trade in our factories means better and better American standards.

In most of the countries of the world there will be a decided shortage of labor after the war. That country will best succeed which protects its workmen by improving their living conditions, guaranteeing a fair return for labor, protecting workmen and their families against accidents and idleness, and making workers better citizens. The country taking those measures will be the country that develops and makes products most economically, and will perform a world service by making goods at the prices fair to other nations.

Nobody has yet suggested sending cheap American soldiers over to France to win the war. Our men at arms are the pick of the country, physically and mentally. We take plenty of time to train them, make them specialists in every branch of fighting. We study them individually to find which are best suited for flying, or signalling, or bombing, or bayonet fighting. We recognize that modern war is a swift game, constantly changing, and that our soldiers must be prepared to learn new trades and new tricks from month to month, and we get ready to teach them these new trades, and also put them in a receptive attitude toward improvements in the fighting game. We feed them like fighting cocks, and spare no expense in clothing them or providing the latest fighting tools.

In the Army and the Navy we have a visible mobilization of man power for results in a foreign country. If we could have the same visible mobilization of man power in our factories for foreign trade it would be a splendid object lesson for those who manage the factories and make the export goods.

To think of cheapness in connection with foreign trade is just as wrong as trying to pin bargain tags on soldiers. Foreign markets are not going to be won or held by cheapened American workers, or bargain methods in American life. As manufacturers, we have got to lay the foundations for foreign trade by going out into our factories and studying labor and costs together. We can sell our export products at reasonable prices by increasing wages along with output, and decreasing the losses caused by labor turnover, untrained workers, spoiled materials and other inefficiency.

Our experience along these lines in the Emergency Fleet Corporation has been most encouraging. With the task of creating new shipyards in a few months, and manning them with several hundred thousand workmen, most of whom came from other trades, we ran into about every difficulty, and problem, and tangle, that could conceivably arise in management. On a large scale we effected an adjustment of man power such as is called for

now in preparing the average American factory for the export trade which we will need to keep our ships employed.

To get production at unheard of speed and in record-breaking quantity, we did something simple and fundamental—and thoroughly human. This was nothing more nor less than arranging wages so that, while our workers produced more for us, they were also able to produce more for themselves. We established the rule that a piecework wage rate set by any shipbuilder must stay in force during the period of the war. Any manufacturer who sets a piecework rate, and then reduces that rate if he finds that he has made a mistake against himself, is doing a great injustice to his employees. Profiting by our experience in the shipyards, I should like to see Congress pass a Federal law making it compulsory to keep every piece rate in effect one year. That would protect workers and furnish a real basis for increased production.

We found ourselves confronted with enormous losses and dangerous delays through lack of skill in special trades needed by workers in the shipyards, and also through the cost of labor turnover. To find 100 capable shipbuilders who would stick on the job, it was necessary to hire and try, discharge or loose 1,000. Every manufacturer will recognize in these difficulties exactly the difficulties that he himself faces from day to day, and which put excessive burdens of cost upon his products. In the shipyards we got around those difficulties by establishing training centers for the various trades we needed, and also by appealing to the splendid spirit which lies in the average worker. We had to train everybody, from the boy who heats rivets right up—foremen and superin-

tendents, and even executives. Starting with a little nucleus of skilled riveters, caulkers, reamers, carpenters, and so forth, we took them out of the shipyard for a time and taught them how to teach their trades to others. Then they went back into the yards to teach green recruits, not in any school or class, but on actual ships, while doing the regular day's work. Under this system it was possible to quickly bring green gangs up to about 80 per cent of the efficiency of skilled workmen. As far as these men learned their trades, and acquired high earning power under our protected piece rates, they became steady enough, and the costly item of labor turnover began to drop. After that, nothing more was needed but the appeal for patriotic service. We found that the shipworkers would not only stick on the job like soldiers, but that in their inherent spirit as fighters and loyal Americans there was an enormous reserve of man power to draw upon—a reserve capable of meeting every demand and every emergency, with power to spare.

That reserve of spirit exists in every American industry. War has brought it to light where executives can see it and to develop this great reserve for foreign trade is distinctly the executive's job.

To fill our merchant ships with goods after the war and hold our own in foreign markets, we must begin now to mobilize and train our man power in manufacturing along the same broad lines followed in training for military purposes. Wake up, American business men! Begin to study the man power in your own organizations. Not with the Prussian viewpoint, which counts human life its cheapest raw material in both the factory and the fighting line, but with the American viewpoint of decent living, opportunity, humanity, service.

Motor Drive at Newburgh Shipyard

THE Newburgh Shipyard, which will specialize on standard 9,000-ton steel cargo vessels, is one of the shipyards made necessary by the present war demands for all kinds of ships. A year ago the shipyard's site was a marshland, while today on made ground that required thousands of cubic yards of fill, there are numerous buildings and four shipways, while the actual construction of four large steel ships is well under way. The launching of the first standard 9,000-ton steel cargo vessel will take place in August and the other three ships will be completed soon afterwards.

The structural steel shop leads the various departments in active operation. The system of motor drive employed in the shop is of special interest at this time, because of the typical example of the emergency war installation.

Some of the conditions, which were taken into consideration, in laying out the drive follows: (1) The machinery must be arranged to allow rapid and economical production. (2) The machines were to be managed by more or less unskilled men and they have to be safeguarded as completely as possible. (3) Time was a vital factor and as deliveries of special apparatus was at that time very slow, the best possible use had to be made of such available equipment as could be obtained within a reasonable length of time.

Power being available from the Central Hudson Gas & Electric Co., it was of course used, and thus the erection of an insulated plant was not

necessary. It saved the labor to run it, eliminated the handling of fuel and ashes, and helped to economize on coal. In order to insure maximum output for each machine, it was decided to use individual motor drive throughout and to provide complete flexibility as to the arrangement of the machines in the shop.

The Central Station only supplies the alternating current, as practically all the machines in the shop—namely, the punches and shears—are of the constant speed type, and squirrel cage motors are used exclusively. The only exceptions are the furnace blower and the bending rolls, both of which require speed variations. The furnace blower, which supplies air for the crude-oil plate and angle furnaces, is driven by a slip-ring motor with a drum-type speed controller. The bending rolls were originally driven by a motor generator set, but due to the fact that this equipment was decidedly antiquated (war conditions making it impossible to secure modern apparatus, at the time when it was wanted), a Westinghouse variable-speed, alternating-current motor is installed to fill its place.

From the accompanying illustrations, it can be seen that all the machines are belt driven. This is not the best practice for such machines, as a punch or a shear. Engineers generally favor mounting the motor on the machine and driving by means of gears. However this type of drive requires special machine work and a special high starting torque motor, and had these been de-



Type of wire cages used as safety guards on belt drives

cided upon, it would have added months to the date of delivery of the equipment. For the above named reason standard motors with belts are in use.

The high starting torque motors would have been desirable, because of their considerable fly-wheel effect, but it was thought that the belts would slip enough in starting to relieve the motors of the excessive stresses that occur at this time and so far this has proved to be the case, as none of the motors have given any trouble. This result has been gratifying to the engineers in charge, since time did not allow a power list to be made of each machine. The motors were selected largely by



The Newburgh plant represents a compromise between direct drive and belt drive of machines, ability to secure motors governing the choice

judgment and the supply of motors available for early delivery.

Wire screens carefully protect all gears, pulleys and belts. All of the motors, that are started and stopped by the steel workers are controlled by auto starters or oil switches, which have no exposed live parts and can not be improperly manipulated by the most careless person. Protection against overloads and failure of power is provided for by automatic means.

The central station supplies the current at 5,700 volts. A small substation in the shipyard, which consists of a bank of transformers and a panel carrying the necessary switches and meters, reduces the voltage to 220 volts, for use around the plant.

The Making of Templates

By Fred N. Nelson

Vice-President of the Seattle Metal Trades Council

IN this national crisis, when ships are the Nation's first need, anyone who can save time in their construction and utilize the necessarily diluted labor to best advantage is performing a real service to his country. For that reason the following suggestion is offered in the hope that it may be found useful in simplifying and standardizing ship-construction methods. No delays or radical changes are involved in the plan. It is simply an evolutionary improvement over old



A set of big plate rolls in the Newburgh shipyard

ways of doing things, a result of practical experience, and a proved success in saving time, money, tools, and material.

The evolution of shipbuilding has led to an ever increasing proportion of the hull of the ship being developed in the mold loft and laid off from templates, showing all the details required. Practical shipfitters have followed their work into the mold loft and now make their templates there instead of "lifting" them from the ship as they used to do.

It pays to do this work carefully, as every part developed must fit every other part, and mistakes mean wasted precious time and material. In these days of duplication of any number of hulls off the same molds, mistakes are multiplied in proportion; also, the same duplication makes it desirable and economical that the templates be as light and

strong, simple and yet complete as possible for handling in laying off the work.

If the developing, making, marking, and checking of templates is done by ship-fitter loftsmen who know their business, who know how to make their templates "foolproof," a less skillful class of workmen can lay off the required number of plates, shapes, etc., without a reasonable excuse for making mistakes, one template, perhaps, doing duty for various parts of the same hull and any number of hulls, all the details given on the template "foolproof."

This means a great deal in these days of abnormal demand for ships, and consequently for skilled men to build them. It saves mistakes and helps to solve the problem of making the really skilled men go as far as possible.

The principal reason for this article is the fact that there is such a wide variation in the methods of various yards and sections in the construction and use of templates, which can be improved upon and save time in the construction of ships, and therefore have an important effect in winning the war.

The writer learned his trade at Bath, Me., when steel shipbuilding was in its infancy. Methods were crude, and nearly everything was "lifted." The custom there at that time was to mark location of holes with pieces of brass tubes dipped in whiting, which often gets rubbed off or misplaced, which causes omission of holes or holes punched in wrong places. Loft work was limited to fairing lines and making "screeve board," besides templates for stem and sternpost, and later frames, though not on the universal system. The standard template wood used was three-sixteenths inch to one-fourth inch thick, of suitable width, mostly local pine.

Experience has taught us that templates made of Douglas fir or sugar pine are best, because these woods do not shrink or swell lengthwise, and therefore are not affected by moisture, like paper and other material experienced with. Also, work can be laid off more quickly and safely from wooden templates, and they can be stored away for years without changing.

Properly constructed, they also stand rough handling, such as they are bound to get, especially where outside men work piecework.

At San Francisco the template wood used is similar, and the system there is to bore five-thirty-seconds inch holes for centers of holes, and the loft work is developed so that nearly all the hull is laid off from template furnished from the loft. The system is quite satisfactory, except that five-thirty-seconds inch holes make it necessary to "ring" the location and to first prick punch the holes, then take the template off and center punch them, making two operations; also, the prick-punch marks being very light, holes are often missed, causing extra drilling and counter-sinking when work is assembled. The five-thirty-second inch holes were bored through templates in place on the floor with hand drills.

Seattle System

At Seattle the system in vogue was to bore templates the full size of the hole to be punched in the plates or shapes, which they thought made it necessary to make the templates of heavier wood, from three-eighths inch to one-half inch thickness, which made them very clumsy and

hard to handle, and because of the big holes and the cut-outs leaving cross-grained pieces unsupported they were actually weaker than the templates made of lighter wood, which need not be cut-out except to working edges, and also can be more easily braced diagonally.

The chief objection, however, is the fact that this system required the use of duplicating punches of all the various sizes used, and type for wood for use in the mold loft, and other type for steel for use in the yard, of which each workman should have a full set, so that his time would not be wasted to borrow or steal the particular sizes needed.

The punches were too heavy to carry even one of them conveniently in the pocket. They are also quite expensive to make and easily spoiled; also the shoulder of the punch often catches on the side of the hole and tears the template when inexperienced workmen try to work fast. The output of the mold loft was often limited to the capacity of the boring machine, and at times templates otherwise ready to go out and needed were piled up for days waiting to be bored.

Improved San Francisco System

Now the writer, on going to work in a new shipyard in Seattle, discovered an opportunity to improve on the San Francisco system without losing any of its advantages.

He saw that the center punching could be done with one operation by simply boring the holes $\frac{3}{8}$ inch and touching up the center punch to fit that size hole. This simple act also disposed of the many sizes of duplicating punches and made the center punch, which a ship fitter always carries in his pocket, his duplicating punch for all sizes, for no matter how large or small the hole, it is always punched from the center and the size is marked by the ship fitter. It also permits the construction of templates both lighter and stronger than the Seattle system previously used and saves lumber and tools; $\frac{1}{4}$ -inch template wood is preferable, using $\frac{3}{4}$ -inch tacks for nailing.

The holes can be spotted on the top template and bored through all adjoining laps, butt laps or butt straps, stiffeners, bounding angles, etc., in place on the floor most conveniently by using a small drilling machine, either air or electric, which all shipyards have nowadays. There are other minor advantages which for brevity's sake we will not mention, but which in the total count up.

The $\frac{3}{8}$ -inch bits are not as easily broken as the 5-32-inch and can be prevented from boring into the floor by slipping a piece of waste wood under template while boring and also by filing threads off, leaving the point. Boys quickly get to be experts at boring holes fair through several thicknesses at a time.

The plan is absolutely practical and will help solve the problem of utilizing the less skilled ship fitters to best advantage; it will save hundreds of thousands in money, tools, and materials, and save time, which can not even be calculated in terms of money at this time.

Mr. W. H. Woodruff, the Fireman's Fund special agent in Los Angeles, is paying a visit to the head office. He reports marked activity in the shipbuilding industries of the southern city.

Electric Hoist Controllers

THE rapidly increasing use of electric mono-rail hoists and the widened field of application will bring with it a proportionate increase in complaints regarding motor and other kindred troubles, much of which will be caused by the lack of knowledge on the part of the operator, or the disregard of ordinary precaution in using the electric hoist.

As the operator must manipulate the hoist by means of the controller, it is essentially necessary that he should have some knowledge of this most important part. To this end, the following is offered as the purpose of the controller.

The variable speed and foundry controller on an electric hoist may be compared with a valve on a steam engine, insofar that it regulates the flow of steam into the engine cylinder, in starting the engine, and is used to control its speed while running.

If there were no means of controlling the current, it would enter the motor at its full force and exert a very sudden and heavy pull. The hoist would then start to lift violently, which might cause serious damage, either by burning out the motor, breaking the gears or tearing the lift-nig cables. This applies to the larger motors. Small motors have more of a choking effect on the current flow so that they may be started without any means of controlling the current, without any of the above-named bad results. To insure a gradual rather than a sudden speeding up, a resistance is provided in the circuit which may be compared to a throttle on a steam engine which is opened slowly when the engine is started, and in some cases is used to control its speed.

When the operator moves the crank or pulls the operating cord on the controller from one notch or step to another, it cuts out more and more resistance and allows more and more current to enter the motor, which causes a proportionate increase in speed, until, when the last notch or step is reached, all the resistance is cut out and the full pressure of the line is exerted upon the motor, which causes it to attain its maximum speed.

The operator should not move the handle nor the crank from one notch or step to another until the hoist has attained the speed provided for by the preceding notch, and yet there should be no unnecessary delay in moving from one notch or step to another, if the resistance is provided for starting purposes only.

If the operator is careful in manipulating the controller, the hoist can be started and the speed increased to its maximum without any perceptible jar or bolt, as at all times, except when the hoist is lifting at full speed, the entire current passes through the resistance. This resistance is built in several parts or sections, each one of which is represented by a notch or step in the controller, and the movement of the crank or handle from one notch to another regulates the increase or decrease of speed and also determines the evenness and smoothness of the hoist's motion as well as its freedom from violent jolts or jars.

The Single Speed Controller

So-called, is in reality not a controller at all, but only a reversing switch, without any resistance,

by means of which the power is thrown on and off, thereby starting, stopping or reversing the hoist, and does not afford more than one speed, except that the speed will vary on direct current hoists, with the load being lifted. Light loads will be lifted very much faster than full loads.

When alternating current is used, the speeds are practically uniform for all loads.

With this controller the motor is thrown directly across the line, or, in other words, the full force of the line voltage is exerted upon the motor, without any resistance being interposed.

Single speed controllers are not recommended for motors larger than 3 h. p., as larger motors cannot be operated safely by throwing in the full line current without waiting for the armature or rotor to attain its full speed.

As it is in a sense merely a line switch for making and breaking connections to the line wires, the complication of controller resistance and multiplication of controller details is eliminated.

The advantage of the single speed controller is its simplicity and low price.

The disadvantage of the single speed controller is the liability of the motor starting with a jerk. Usually this jerk is negligible with small motors.

The single speed controller may therefore be recommended for use, except where delicacy of movement is desired, such as in drawing patterns and hoisting and lowering copes or setting cores in a foundry.

Variable Speed or Rheostatic Controllers

The variable speed controller is one which in addition to starting, stopping and reversing the motor, enables the operator to obtain a number of different speeds in lifting the same load. With it, the load can be started slowly and then speeded up or lowered rapidly until nearly landed and then slowed down for setting the load. The number of speeds obtainable varies according to the number of switch points connected to resistances, which regulate the flow of current into motor. In effect, when the switch is thrown on the first point, owing to the resistance, only a small percentage of the line voltage is exerted on the motor, the motor then running at a speed corresponding to that voltage. A further movement of the switch cuts out more resistance and throws on more current until, when the last point is reached, all resistance is cut out and the full line voltage is exerted on the motor, driving it at its full speed.

For running motors any length of time, at any other than maximum full load speeds, the current must be kept running through some of the resistances, and to do this safely, resistance of large proportions must be used so that dangerous heating will not result.

Foundry Controller

A foundry controller is somewhat similar to the variable speed controller, only with a greater latitude of control or operating speeds, and it is available at present for direct current hoists only. This controller enables the operator to lift and lower the load at a very slow and even speed, such as is needed in drawing patterns, setting cores and raising and lowering copes, without jarring or jolting, which might cause damage to the mold.



A Wage Report that is Ready

WHEN Congress enacted, as a part of the income tax law of 1917, a provision requiring employers of labor to report to the federal government the names and respective earnings of their employes whose wages exceed \$800 a year, a majority of employers in general and "big" employers in particular were totally unprepared to meet the requirement.

Occupied with co-operation in Liberty Loan campaigns, lending their aid to Red Cross and other patriotic movements, coping with abnormal conditions in commerce and industry, the majority of big business men were too busy, at first, even to foresee the difficulty that was to attend their compliance with the income tax law. It was when the time approached for filing their returns that they began to realize the seriousness of the situation.

The difficulty was a mathematical one. Employers discovered that their time-keeping and paymaster's departments had been using systems of accounting that, without the expenditure of much additional time and labor, could not be made to yield the data demanded.

In the great majority of cases the names of employes had been massed on the pay roll books, without thought to a continuity of record for individuals—since such a record had never before been deemed necessary. To ascertain the year's earnings of any employe, such a system made it necessary to analyze the payrolls for an entire year, "pick up" each employe from among the many others at the first pay day in the period, and compile his record from the succeeding pay days.

In the cases of many concerns, this difficulty was further complicated by the fact that employes were "carried" by number and not by name. Since numbers had, in some instances, been "handed down" as employes had left the concern, a given number during the course of a year might indicate several persons.

Small concerns found so ramified a search an arduous task. For enterprises whose working forces ran into the thousands, the difficulty multiplied itself to grave proportions.

To the general rule there were a few rare exceptions. A small number of concerns, either through foresight or by fortunate accident, had adopted pay roll accounting systems that made easily available the exact information the government required. One of these was the Willamette Iron and Steel Works of Portland, Oregon.

Although this Portland concern, which employs upward of 1,200 men and is engaged in the manufacture of logging and marine machinery, experienced the extraordinary expansion of business and acceleration of activity of the extraordinary times, it found itself in a position in which to make its report to the treasury department on the earnings of its employes was virtually as easy as figuring a single pay roll.

Individual ledger cards for employes—one for each workman—constitute the secret of the Willamette Company's plan. In theory and practice, every employe is a creditor of the concern. His account is kept posted up to date, not monthly, nor bi-weekly, but daily.

Record Searching Eliminated

To ascertain, at the end of the year, month or week, an employe's earnings for the period in question, it is necessary only to total the entries on his ledger card. Thus is eliminated, entirely, the need of tracing each employe's name through a mass of records and figures for the entire year, month or week. In that way there can arise no confusion of identities of employes from the changing of designating numbers.

Not only in its adaptability to the demands of the government, but in its thoroughness as a combined time-keeping and cost-accounting system, the pay roll plan of this Pacific Coast manufacturing concern is remarkable. Daily this company



on each job. For this purpose, the work-tickets are assembled as to order numbers. In the control ledger the adding machine prints the date of each entry automatically. The operator lists the number, hours and money amount of labor of each employe who was assigned to the particular job that day. Automatically, the machine totals hours and amounts and transfers the two totals to the accumulating wheels. When this posting has been completed, the total accumulated must agree with the pre-determined totals of the pay roll and work tickets.

Thus, it may be seen, the pay roll of the Willamette Company is triple-checked before a workman is paid.

Shows Labor Cost

Ledger posting and figuring machines are not only enabling the Willamette Iron and Steel Works to comply easily and quickly with the income tax law, but are providing the company with a wealth of figure facts concerning the most expensive of all expense sources in manufacturing—labor.

Figure facts supplied by adding machines to this concern have enabled its officials to meet the demands of the government on schedule time and without employing additional office help or the installation of other records. Making returns to the federal officials in this or any succeeding similar occasion is merely a routine matter. No confusing haste is entailed because this firm has inside facts concerning its pay roll that make a basis for all such reports instantly available.

For any employer the machine-posted, employe's wage ledger will provide an easy solution for the income-tax-return problem.

TEAK ON SHIP BOARD

By J. H. Dieckmann, Jr.

Teak, technically known as *Tectona Grandis*, grows in British India, including Burmah and Siam, and eastward into the French colonies of Cabodia and Cochinchina, then southward to the Dutch Indies and Java.

The best wood is that which grows in Siam and which is shipped from the ports of Saigon, Bangkok, Rangoon and Moulmein. The good that grows farther south, coming from the island ports, is not considered in any way equal to the wood shipped from the above mentioned ports.

The trees grow in the forest, not close together, among an endless variety of other woods, so it is necessary to cut them and gradually accumulate the logs in small quantities for shipment.

In India plantations of teak have been tried, but the cultivated wood has been found to be not as good as the natural wild growth.

The transportation from the mountains where it grows wild is an expensive problem. Of course, where there are rivers conveniently situated, the logs are floated down by water during the flood seasons of the year. This is particularly true in Indo-China, where the wood coming out of Saigon is cut many miles in the interior (in fact, in Eastern Siam where the best wood grows) and floated down on the Makong river and its tributaries. At other shipping ports, the wood arrives partly by water and partly by rail, carts and dragging, in which latter case elephants are very extensively used.

Teak is a wood of medium coarse grain, greasy to the touch and having a strong aromatic odor of oil. It is moderately hard and of medium weight, averaging in its seasoned state, about 45 pounds per cubic foot.

The sap wood is light in color, while the heart wood has a dark golden yellow or brown color, and darkens considerably with exposure to the air. It seasons very well; does not split, warp or shrink when thoroughly dry. It is easily worked, takes a beautiful polish and is admirably adapted to carving, as is shown by its extensive use in Chinese and Burmese woodwork. In the Orient it is extensively used for furniture, house trim and other decorative purposes; for example, the noted monasteries of Burmah, where the most gorgeous carved work is to be seen; but its principal use is in shipbuilding, where it has no equal nor substitute.

The oil in the wood resists the entrance of water into the grain and prevents it from becoming water soaked, even when long exposed to submersion. One of the most important characteristics of the wood, however, is its low free acid contents, which feature, in connection with its oily nature, prevents corrosion of iron and steel when placed in contact with the wood. These are such important qualities in teak that no other wood is used on warships for decking, armor plate backing, joiner work, etc. We have all seen the beautiful decks of our big war vessels and palatial Transatlantic liners, and probably but few of us were aware that these clean spotless surfaces were all covered with teak.

The wood has been scarce in the markets of the U. S. for some time on account of its difficult transportation, but it is now coming into the Pacific Coast markets very freely and in the construction of our new fleet of steel and wooden vessels we should use this most remarkable wood extensively and add largely to the long life of our new merchant marine and at the same time materially reduce its depreciation and upkeep expenses.

The regular monthly meeting of the employees of the Fireman's Fund head office took place in the assembly room at 5 p. m., August 6th, when they were addressed by A. W. Follansbee Jr., Marine Secretary, upon marine insurance and correlated subjects.

A Solution for the Merchant Marine Problem

By Frank Waterhouse

AS any present extension of Pacific overseas trade is impossible on account of scarcity of vessels, which condition will remain during the period of the war, our consideration must necessarily be directed to the extension of Pacific overseas trade after the war is over, and satisfactory peace terms have been secured.

Our first move in this direction should be directed to wards placing and maintaining in trans-Pacific carrying a substantial and suitable American fleet. "Trade follows the Flag," as is being thoroughly demonstrated by the enormous extension of Japanese commercial influence during the last two years. Approximately 89 per cent of the vessels now operating between Pacific ports of the United States and the ports of Japan, China and Manchuria, and a slightly less per cent between the Pacific ports of the United States and the Philippines, Malay Peninsula and British India, are Japanese.

Japanese Nation Supports Its Lines

The Japanese steamship lines are liberally supported by the Japanese nation, for the purpose of extending and developing the foreign trade of Japan for the benefit of Japan. They consistently favor their own countrymen in the allotment of steamship space by preferential rates and in other ways. They are shrewd, capable, energetic—always working towards and keeping in constant mind their ultimate goal—namely, the complete domination of trans-Pacific carrying trade and, through such control, the lion's share of the trade of the Orient.

I view with great misgiving the increasing power and influence of the Japanese on the Pacific.

A very few years ago, the cotton trade with Japan was handled in this country by American houses, who sold the cotton to Japan c. i. f. Now practically all this cotton is purchased at, and controlled from, point of origin to ultimate user by Japanese. The same applies to other important commodities, particularly soya bean and wood oils, imported from Manchuria.

The Japanese are seeking control of the jute and gunny importations from British India. I am reliably informed that one Japanese firm alone, which had no direct representation in Calcutta prior to 1912, has exported over 50 cargoes from that port during the last two years.

First Establish the Flag

"Trade follows the flag,"; therefore we must establish the flag before we can hope to secure the trade. This war has taught us that we can no longer depend on the merchant fleets of other nations with which to develop our overseas trades.

How are we going to develop and successfully maintain a large American merchant marine in foreign trade?

Surely this is a very debatable question, to which experience and capable thought should soon be directed. Would it not be well to request the President to appoint a commission to consider this question, and to recommend a policy for the country to adopt as soon as circumstances permit?

Within the next two years the United States hopes to possess a large merchant marine available for foreign trade expansion. For many years prior to the present war it was found impossible to op-

erate successfully under the Stars and Stripes in foreign trades, owing to the extra cost of American construction and to the increased expense of operation under our navigation laws. Can these difficulties be overcome without repealing the Seaman's Act and completely revising the navigation laws of the United States, and without adopting a policy of ship subsidies to which so much strenuous opposition has been directed in the past?

Changes Desired in Seaman's Act

Any attempt to repeal the Seaman's Act will meet with great opposition. The influence which secured this legislation is probably more powerful today than at the time the act was passed. There is no doubt that it should be repealed or materially changed, and that our entire navigation laws should be reconsidered and liberalized so as to more nearly conform to the navigation laws of successful maritime nations.

Is this the proper and best time to attempt such changes?

Is it wise to invite further controversy with the labor unions, if that can be avoided?

Would it not be better first to allow our Government to satisfy itself by practical demonstration that these laws should and must be altered?

Would not the following plan be a practical and better one to recommend in the meantime?

Existing law gives the President authority to sell in whole or in part, to lease or charter the vessels now owned, under construction, and to be built by and for the Emergency Fleet Corporation. It is obvious that the item of cost can receive little consideration in employing these vessels for commercial purposes after the war is over. The cost of these vessels is a war expense and will have to be so changed.

United States Should Retain Vessels

Now, instead of selling this emergency fleet in whole or in part, I suggest that the United States should continue to own it; that it should charter the vessels to responsible individuals, firms and corporations citizens of the United States, to be operated in trades approved by the Shipping Board under United States Shipping Board's form of **Bare Boat Charter**, running three or five years, with renewal options; annual hire to be based on 15 per cent of a valuation fixed for chartering purposes at £14 per deadweight ton carried.

The maximum price for building an ordinary, good cargo boat in England for some years before the war was about £9 per deadweight ton carried; the present price for similar boats now being built for the British government is £16. It is not expected that the price will be less than £16 for some years to come.

Therefore, if the modern British cargo boat is valued at £16 per deadweight ton, and our Emergency Fleet is valued for chartering purposes at £14 deadweight ton, the American charterer would be quite on an equality with the British shipowner, as the latter would have to earn at least 15 per cent for interest, depreciation and insurance on £16 per ton valuation, while the American charterer would be paying in hire 15 per cent on a £14 valuation,

which would be sufficient to equalize the increased expense of operating under the American flag.

Returns to the Government

Of course, this agreement is based on the value of new tonnage. Such a plan would allow the government 5 per cent per annum for depreciation of vessels, 6 per cent for insurance and 4 per cent for interest. The charter rate would decrease each year as the value of the vessel was written down. If the use of government form of time charter was preferred, this form could be easily utilized on somewhat similar lines.

I believe the idea of government ownership of public utilities will increase in favor as time passes, or at least it will increase in favor during the next few years. Through the ability of the United States to properly finance the railroads, rehabilitate and operate them as one system, without legal restriction, such good results and such enormous saving should be effected that the people of this nation may prefer to at least experiment further in the direction of government ownership of public utilities.

The plan of the government retaining possession of at least the bulk of its merchant fleet will probably meet with popular approval, and the government would be able to demonstrate for itself the disadvantages of some of our existing laws and the necessity of such additional legislation as may be needed from time to time to place our ocean car-

riers on a competitive basis with the ocean carriers of other nations.

Fund for Building More Ships

The depreciation fund and the profits earned from the insurance fund would provide means for building further vessels as time passed. The government would be able to regulate the trades in which its vessels should be employed and would at all times be in possession of a large fleet in case of national emergency. This plan could be adopted under the existing law without any further legislation.

In order to stabilize rates and to control, as far as possible, ruinous competition, I think our government should approve and encourage the formation of steamship conference agreements, which have proved of such tremendous importance in building up British and other foreign merchant marines. These agreements would, of course, be made with government approval and under governmental regulation and supervision.

American vessels should be allowed to use Chinese, Japanese and Filipinos as sailors, firemen and in the steward's department when in competition with foreign vessels using similar crews.

It seems to me that if these suggestions should be adopted, there is hardly any limit to the possibilities of expansion of an American merchant marine and of Pacific and other overseas trade.

Power Plant of the "Libby Maine"

CONSIDERABLE interest has been displayed in local shipping and engineering circles in the initial voyage of the motorship "Libby Maine," the first vessel on the Pacific to be equipped with Dow-Willans Diesel engines made by the Dow Pump and Diesel Engine Company of Alameda, California.

The "Libby Maine" was constructed at the North Portland wooden shipbuilding plant of the G. M. Standifer Construction Corporation and is built of Oregon fir and is rigged as a two-masted schooner with cargo booms on both fore and aft main masts. She is 240 feet long over all, 43 feet beam, 24 feet moulded depth and has a carrying capacity of about 2,000 deadweight tons.

The main power plant consists of two 320 brake horse power Dow Diesels, four cycle, direct reversible engines, having each six cylinder, 12 inch bore by 18 inches stroke and operating at 250 revolutions. This speed is geared down on the propeller shafts to 100 revolutions, thus enabling the use of large and efficient propellers. The voyage from Portland to Seattle and later from Seattle to Bristol Bay, Alaska, demonstrated the fuel consumption of the engines to be .42 pounds per brake horse power hour.

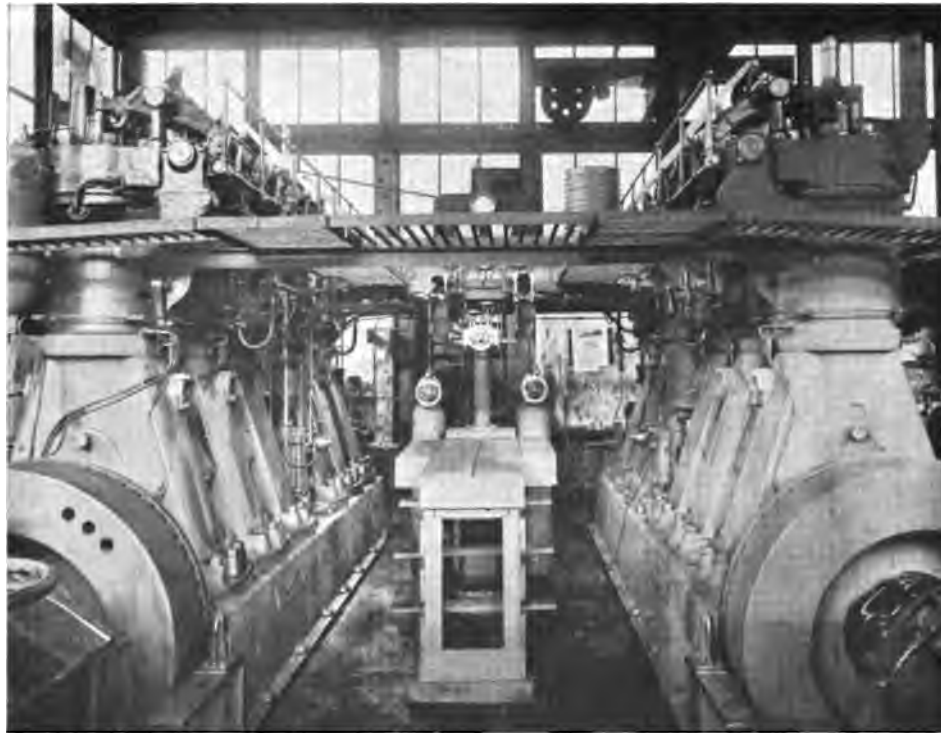
The engines were given a dock trial, subsequent to shop tests at Alameda, the starboard engine being run for twenty hours and the port engine for six hours. Then followed an unofficial short trial run on the Willamette, the vessel being accepted without formal trial, and then the vessel proceeded to Seattle and later to Alaska. It was found that on the Willamette and Columbia river

channels that the "Libby Maine" handled nicely and that the manoeuvring qualities of the engines were all that could be desired.

Owing to a high keelson passing between the engines a one-man control station was arranged, the operating station being on top of the keelson between the engines with air pressure, circulating water and fuel oil gauges set on a single board. The engine room telegraphs are located on the upper part of this board and the levers for controlling the port and starboard engines on either side. The air compressors are driven directly off the forward end of the engine crankshafts and are of the three-stage Revall type with cylinders and inter-coolers entirely immersed in water. The auxiliary air compressors are driven by 30-horse power Standard distillate engines, which also drive bilge and fire pumps of the plunger type with belts. Power for the wireless outfit is supplied by a five-horse power Standard distillate engine.

The deck machinery includes a powerful anchor windlass and four cargo winches, all electrically operated, current being supplied from a 125-volt General Electric generator driven by a three-cylinder, 80-horse power Standard distillate engine, this engine also furnishing power for the electric lighting system.

The main engines are governed by the Dow centrifugal governor, which operates directly on the supply of oil to the injection valves. This type of governor had been thoroughly tested on the Dow Diesel furnishing power at the Dow shops and was found to take care of the sudden variations of load in the shop in good style, keeping



The Dow Diesel Engines for the "Libby Maine" as they appeared set up in the Dow shops at Alameda

the engine exceedingly close to any predetermined number of revolutions.

The full complement of the "Libby Maine's" crew is eighteen men, the engine room being responsible for seven of these, three engineers, three oilers and a wiper. Accommodations for both officers and crew are very spacious, as these boats are often called upon to transport large numbers of cannery hands. In addition to the officers' quarters there are six state rooms supplied with hot and cold water and heated and lighted by electricity.

While on her initial voyage, the engines of the "Libby Maine" were not operated continuously at full speed, running for a considerable time at 230 instead of 250 revolutions, the vessel maintained a seven-knot sea speed, which is very good consid-

ering her power.

There has been a tendency on the motorships built on the Pacific Coast toward under powering and results of this underpowering have been somewhat accentuated by the fact that propellers operating at from 200 to 300 revolutions are not well suited to slow-moving craft. The showing made in the case of the "Libby Maine" would indicate that the slight loss of power through gearing is more than compensated for by the increased efficiency of the slow-turning propeller.

The performances of the "Libby Maine" so far have been highly satisfactory both to her owners, the Dow Pump and Diesel Engine Company, and the Pacific Machine Shop and Manufacturing Company, which concern constructed the deck machinery.

The Gold Situation

By John Clausen

Vice-President the Crocker National Bank of San Francisco

No more interesting chapter will be written in economic history than that which deals with the problem of the proper distribution of the world's gold supply. Probably there was never greater need than now for co-operation of our industrial and financial elements to devise a workable plan for control of an increased production of that precious metal.

A great man once said, "Necessity opens our eyes to the advantage of fresh principles," and as I see it this is now our position. The greatest war that the world has ever known has so altered conditions that new methods and customs must necessarily take the place of the old in order to keep abreast of the times. In reality, a very important issue is presented; namely, whether the standard

of value of the world will in future be gold or become a combination of silver and gold, and if so, what effect such changes would have on the trading powers of nations. It is obvious that if a bi-metallic standard were adopted as media, the question of the value between the metals themselves would become one of vital issue. Then again, there may be a scarcity of gold available as money for the purpose of effecting the sale or purchase of commodities, or as affecting the position of governments and banks and the availability of that precious metal in proportion to liabilities.

There are many interesting angles from which to view this important subject, but it may be of general benefit to recount what happened in this

country during and after our Civil War, and in Europe since the beginning of the present hostilities.

As an inevitable result of government policy which had placed upon the banks a burden too heavy for them to carry, the financial institutions in New York and other sections were, during the Civil War, forced to discontinue specie payments, which subsequently brought about the suspension of the National Treasury.

At the beginning of 1862 a bill was introduced which had for its purpose the making of government notes legal tender, it became law in February of the same year. The issue of greenbacks payable to bearer, after several amendments of this bill, was authorized up to a maximum of four hundred million dollars. When the greenbacks were issued it was expected that they would circulate at par with the gold dollar, containing 23.2 grains of pure metal, but a year after the Legal Tender Act had been passed paper money had an exchange value equal to only 14.5 grains of gold. Its value rose in August, 1863, to 18.4 grains, but fell in July, 1864, to 9 grains, which was its lowest point. The premium on gold was then such that a dollar in paper money was not worth more than 36 cents in gold coin.

The most striking example of profiteering during that period was the Black Friday Conspiracy of September 24, 1864, when a group of speculators bought up large quantities of gold—creating an artificial scarcity—and as a result that commodity could only be obtained from this clique at ruinous terms. This brought about many failures, and to check gambling in gold and reduce the premium on it, the Anti-Gold Law was passed, but as it did not materially bring the premium on gold to a lower level, it was very soon repealed.

In June, 1862, Congress authorized the use of "postage and other stamps of the United States" because of the enormous increase in demand for small currency, notwithstanding the circulation of the so-called "shin-plasters," which were issued in denominations of 5, 10, 20, 25 and 50 cents.

In some of the Western States attempts were made to maintain specie payments, after they had been given up in the East, but California alone had the distinction of remaining on a gold basis during the Civil War, and it was not until 1876 that gold again sold at par throughout the United States.

Since that period the more notable event was the panic of 1893, which was followed by a depression throughout the Nation, with the result that a large amount of gold was drained from this country to Europe. The Treasury's reserve became so low in November, 1894, that a sale of Government bonds was resorted to; in fact, the stock of coin was reduced to such an extent that there were outstanding more gold notes than coin, leaving a part of the certificates represented by bullion in the form of bars. Again during February of 1895, and also in July of the following year, strong syndicates headed by leading bankers in New York accomplished the difficult task of bolstering up the finances of the United States Government and it was largely due to their activities that the United States remained on a gold basis. The success of these combinations had a far-reaching influence on business and as soon as it was seen that the gold obtained from abroad

was not going to be lost at once as in previous bond sales, confidence was again revived and the financial position of the United States improved so favorably in the eyes of Europe that it was possible to float large blocks of American securities abroad.

In August of 1914 foreign exchange became demoralized, and to remedy that situation a gold pool was again created, when leading banks and bankers throughout the country joined in an agreement to provide for mail and telegraphic transfers to Europe in lieu of gold for export, which proved a helpful factor in restoring order and confidence.

For several years prior to the declaration of war in Europe the countries of France, Russia and Germany especially had been engaged in an eager competitive scramble for gold, which resulted in the holdings of their great state institutions expanding rapidly. On this account, at the outbreak of the war we found them with what was up to that time the peak of their gold reserves.

The embargo was universally adopted clearly demonstrates the desire of every commercial nation to control and retain its supply of gold. As far as the United States is concerned, other than the necessity of obtaining Government permission to export gold in coin or bars, its circulation in this country has not been restricted—although the efforts of banks and individuals alike are directed towards harmoniously co-operating with the Federal Reserve Banks.

One of the most curious economic features of the present situation has been the strong light which it has thrown on the fact that it is possible to have too much of a good thing, even when that thing is gold. This is forcefully demonstrated if we glance at the financial position of the Scandinavian countries where the law has been carried so far as to relieve the government banks of the statutory obligation to buy gold, and coin it for all those who bring it in. This naturally prevented other countries dealing with Scandinavia from paying for purchases in gold, and the barter of commodities was the only means open for concluding commercial transactions.

It has lately been said that the world is divided into two classes of countries; those which refuse to accept gold and those which refuse to part with it. Some times it is asked how any one can possibly refuse to take gold in payment, but this is easily explained by the fact that gold in bars or foreign coins is not legal tender anywhere. No person in Scandinavia, for example, could be made to take gold bars or American eagles in reimbursement for goods to meet a required payment in legal tender currency of that country.

There are comparatively few who really understand to what a great extent more credit can be made to do the work of wealth, although the time will come when credit will assuredly break down unless it is built upon a solid foundation. The issue and circulation of paper credits throughout the leading nations of the world has been proportionately far greater than their holdings of gold and has naturally resulted in inflation on an alarming scale.

The thought, however, that Europe may possibly repudiate her war debts for the sake of reducing the amount of currency outstanding against government bonds or notes is obviously superficial. Finance has become an international, rather than

a national question and the monetary history of any one country tends to become more and more merged in the monetary history of the whole civilized world. International credit is firmly established on a gold basis and unless the flow of gold is not too strong in one direction no country has any interest in upsetting the present standard, although it is contended that notwithstanding a great production of new gold it may not necessarily make universal gold standardism possible, as it would be a mere drop in the bucket of our future needs. If the world's credit, therefore, is to be carried on after the war with gold, every ounce that can possibly be produced will be required.

The production of gold is a vitally essential industry which, for obvious reasons, should be promoted to the fullest extent. It is very apparent, however, that with a fixed value for the yellow metal, together with the rapidly increasing cost of material, labor and transportation, this particular industry as now developed is seriously affected and it would seem inevitable that unless some form of government relief—but only as a temporary war measure—is given to the producing mines, many of them will be compelled to discontinue operations.

In a letter addressed to the Honorable Charles A. Sulzer relating to the present conditions concerning the production of gold in Alaska, the Secretary of the Treasury clearly voiced the attitude of our Government when he stated, "I fully appreciate that with the rising cost of raw material and labor and with a fixed value for their output, the gold miners are facing difficult conditions. I should be sorry, however, if for this reason there were any relaxation in the effort to produce gold. At no time has this country so much required the largest possible production of gold as at present. Next to food and ammunition, gold is one of the most needed war essentials."

There are people who argue that if the Government would agree upon a plan to increase the value of gold from \$20.67 to say \$40 or \$50 a fine ounce, it would make a settlement of obligations possible with only half the metallic requirement otherwise necessary to redeem outstanding paper credits. This course, radical to say the least, would have a disastrous effect upon all credits and especially reflect upon the cost of living which, in all probability, would climb to limits beyond the reach of the average citizen. Increasing the value of gold or giving it a premium does not necessarily give it a higher purchasing power but, on the other hand, in the final adjustment seriously disrupts the basis of international credit.

When peace comes all the world will be faced with a period of great financial and industrial uncertainty and to pass through it successfully will be a task that will need all the statesmanship civilization can muster. To increase this uncertainty by tampering with the standard of international payment would be an extraordinarily futile means of handling the situation and would only make the confusion worse confounded.

The principal nations of the world have adopted gold as the basis of their currency system. The market price for it is everywhere the same and everywhere equally certain at the standard price of \$20.67 an ounce. It may be an anomaly that

economic civilization should depend for means of payment on the supply of a particular metal, but it will take much ingenuity to find a practical substitute and secure for it the popularity and confidence that gold now enjoys. The mere fact that it has been chosen by the most enlightened commercial nations is strong proof that it is the best single commodity for practical use as a standard.

The disproportionate distribution of gold among world nations attracts attention to the study of the part that this metal plays and is to play in future in the world's economic affairs and the question naturally arises whether the production of gold is keeping pace with the world's expansion of credit.

The vast obligations piled up by the nations at war; the huge issues of paper currency; the re-funding of debts and resumption of specie payments after the war, are among the most urgent and difficult problems with which the world will be confronted. This makes it only too apparent that gold is a necessity for the credit and financial unity of nations and it is therefore essential that an adequate foundation of gold must be created to uphold that system.

One of the first acts of the British government after England was plunged into war was to insure that the gold which was being turned out of the mines should be safeguarded, and steps were taken for the deposit of their new holdings in Canada, South Africa and Australia to the credit of the Bank of England. This arrangement had many advantages and tended greatly to facilitate the concentration of the metal where it was most needed for the settlement of liabilities and Great Britain has in this way used her gold unsparingly to meet obligations to neutral creditors.

The United States stands in the unique position of possessing more gold than any nation has ever before owned at one time, but if we are to perform the part that destiny seems to have laid out for us as the world's banker, it will without doubt be necessary to further increase our gold holdings and for this reason encourage to the fullest extent the production of that metal.

The end of the war will find the old world not only disorganized industrially, but with a volume—just how large no one can foretell—of paper currency that can only be compared with our own greenbacks in the years immediately following the contest between the North and the South. "The problem of the world's currency after the war," says a great economist, "is not of course decipherable at this time. It involves the question, 'When will the war end?'" There is little fear, however, that Europe will demonitize gold and carry out an economic revolution in changing the present standard, as it is evident that the effect of such a move would be almost as far-reaching as that of the war.

We are at the dawn of a bigger financial and commercial tomorrow and while the situation is fraught with a great many difficulties, because there are no precedents for us to follow, we must face conditions as they exist and through frank and free discussion arrive at a practical and sound solution.

Let us hope that our united efforts will crystallize into a practical plan for the alleviation of the present critical situation, and that in the process of correction we may establish those principles which lie at the base of national welfare.



On and About San Francisco Bay

MR. F. GRIFFIN, head of the well-known house of F. Griffin and Company, large ship operators, was recently in San Francisco on a business trip. This concern recently established offices in Portland and will dispatch vessels from that port, Vancouver, B. C., and Seattle, Vancouver being the headquarters of the firm. The South American trade of the concern will have its terminus at Portland. F. Griffin and Company have established a reconditioning warehouse at San Francisco, where cargoes may be segregated and put in salable condition. The San Francisco office is located at 341 Montgomery street and is in charge of Mr. W. N. Tofft, who has been connected with the Vancouver offices of the concern for some years past.

The consul general of the Netherlands at San Francisco received advices during the early part of August that the government was in a position to consider the granting of export licenses through the War Trade Board for commodities at or near San Francisco consigned to the Netherlands East Indies.

The announcement is of interest because of the vast tonnage that has accumulated recently awaiting shipment across the Pacific. Several months ago, before the embargo seriously affected offshore shipments, orders for entire shiploads of goods were placed in this country and the result was that many cars of freight piled up at the port.

Then the Dutch ships were seized, and for a time the movement of goods to the East Indies was discontinued. The essential list was cut down and for a time it appeared that many of the shippers and shippers' agents would incur big losses, for their bills of lading proved to be without value because the goods could not be sent.

Numerous shippers interested hailed the announcement of the War Trade Board with delight, for they can now go ahead with the forwarding of goods and also make additional purchases of essential merchandise. Incidentally, there will be freight in abundance for all the Dutch steamers, and each will have a full cargo for every sailing.

According to "Motorship", the Emergency Fleet Corporation has decided to build immediately thirty-six motorships equipped with main engines of 2,000 horsepower. The vessels will be 344 feet 9 inches long over all, 333 feet between perpendiculars, 46 feet moulded beam and 29 feet 9 inches moulded depth. It is understood that the McIntosh and Seymour Corporation of Auburn, New York, will construct fifty-two 1,000 horsepower Diesels for this purpose and the Skandia-Pacific Company will construct twenty. Presumably the engines constructed by the western concern will be of the Werkspoor type.

The action of the Emergency Fleet Corporation in taking up the Diesel engine is a highly important one, as it indicates not only a full realization of the advisability to taking advantage of all the engine building facilities of the country, but also will prove of vast benefit to the Diesel engine building industry in the United States. As has often been pointed out in the columns of the Pacific Marine Review, there has been a tendency to underpower the vessels fitted with Diesel or surface ignition engines on the Pacific Coast, and this has placed a certain handicap on the performances of these marine power plants. The practice of operating the steam engines on vessels at slightly under their full rated power would be an excellent one to follow in the case of the motorship, but in our underpowered motorships this has not been altogether practical.

The vessels undertaken by the government will be large enough to be commercially useful in many trades and at the same time will be sufficiently powered to give them excellent dispatch as ocean freighters. There is no reason why these vessels should not make the same excellent showing credited to vessels powered with Burmeister and Wain and Werkspoor engines and this will insure such of them as survive the war of a high competitive value in operation against steamers of other nations possessing the advantage of low wage standards.

W. T. Nevins, formerly general superintendent of the Buffalo Dry Dock Company (American Shipbuilding Company), and of recent years marine architect and ship surveyor of Chicago and San Francisco, has been appointed superintendent of ship construction of the Chickasaw Shipbuilding Company, the U. S. Steel Corporation plant now in progress of construction at Chickasaw, the new industrial city near Mobile, Ala.

LARGE BUSINESS MERGER

The firm of Stewart, Lowery and Company has been purchased by Willcox, Peck and Hughes of New York, one of the large insurance brokerage and average adjusting firms of the country. Messrs. Stewart, Lowery and Company were formerly agents for Willcox, Peck and Hughes in this country.

The change was, in a way, forced through the patriotic ambition of Mr. Lowery, who has insisted in finding some sort of niche for himself, where his initiative and energy may be of use to Uncle Sam. He has been temporarily balked in a desire to voluntarily enlist, by the abrogation of the enlistment campaign, but he is making every effort to get into the service and his friends say he will "break in" where his well-known organizing and managerial ability can be of signal use to his purely patriotic

motives, and strange as it may seem, H. S. Bates, who is well and favorably known to the business world, was practically brought back into the business on account of the same reasons of patriotism.

Mr. Bates has been taken from the plow, like Cincinnatus of old, and brought back to the city, where in the management of a business whose ramifications cover a tremendous area and will soon be extended to remote parts of the Orient, in which he is familiar because of his earlier associations with the firm, Mr. Bates, in fact, was mainly instrumental in bringing the business of Willcox, Peck and Hughes to this coast in 1907. At that time Mr. H. S. Bates was associated with Mr. Stewart Lowery.

The firm of Messrs. Willcox, Peck and Hughes of California will be dissolved and will be amalgamated with that of Willcox, Peck and Hughes of New York. Mr. Bates will be resident director and representative. The combination of the Willcox, Peck and Hughes interests, everywhere, under one firm style, is in the line of better cooperation and efficiency. Mr. Williams, so thoroughly acquainted with the marine insurance business, will retain his old position and have the scope of his duties much enlarged. Mr. Cortelyou will have charge of the brokerage end of the business under the immediate direction of H. S. Bates.

It is expected that, with the reorganization, the business of the company will run even more smoothly than in the past.

SHIPYARD TOWN BUILDING

A town especially for shipbuilders is being built in the San Francisco Bay region, work having been started a few days ago. It is Clyde, situated in Contra Costa county, Cal., and designed for employees of the Pacific Coast Shipbuilding Co.

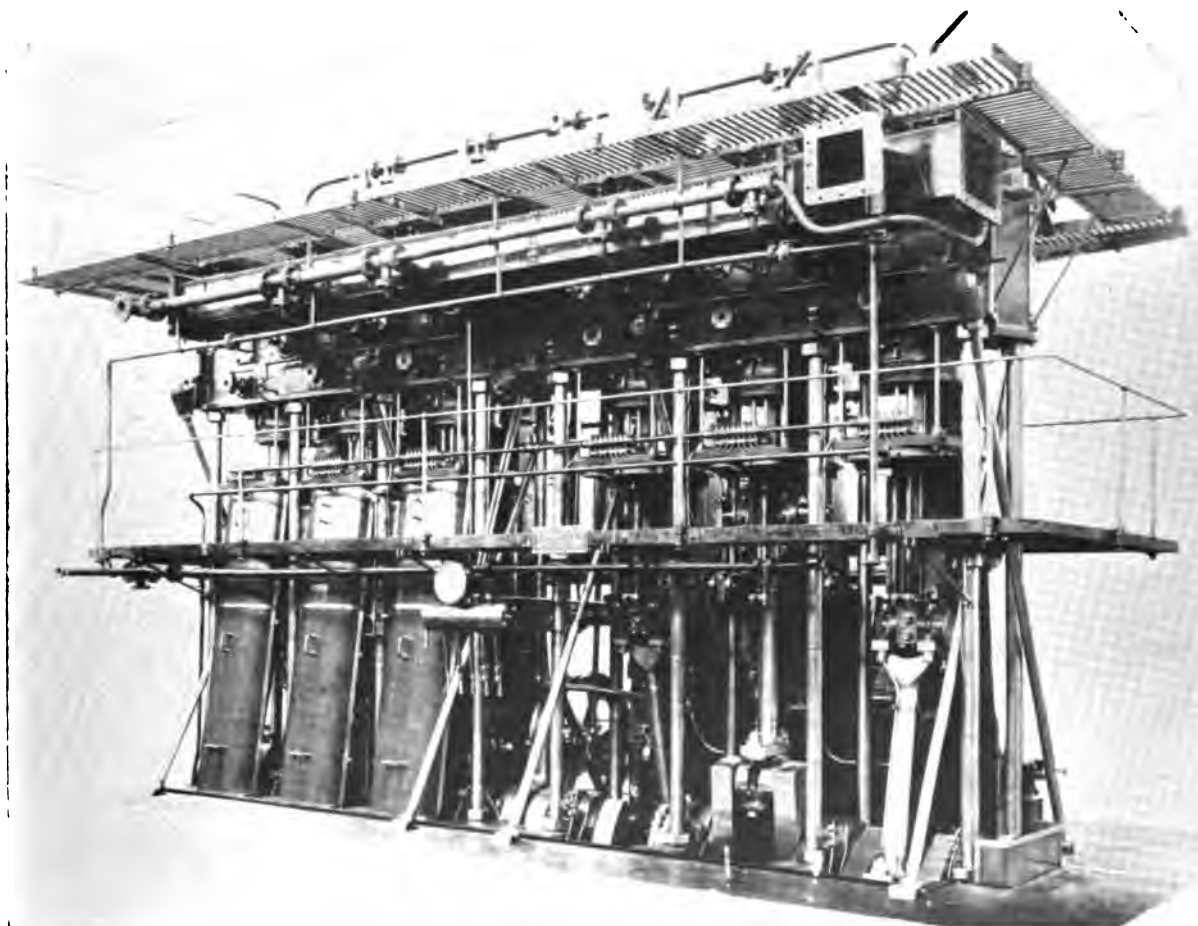
The initial investment, it is announced, will exceed \$1,000,000. A feature of the plan is to be a special track between the town and the yard gates, providing rapid transit capable of much expansion.

The project is being carried out with the backing of the Pacific Coast Shipbuilding Company and with the assistance of the United States Shipping Board, Emergency Fleet Corporation.

A hundred and eighty-five acres are included in the townsite, which has been laid out on lines embodying the latest ideas of town-making.

The work has been started on a scale calling for the completion of two houses a day. Within a short time of the beginning of work, it was announced when the start was made, 150 men would be on the site. The houses, to be so placed over the town that present and future crowding is avoided, are to be put up in units of twenty to facilitate construction.

The project, which is in the hands of the Clyde Company, is to be developed with the least possible delay. It is hoped to make a speed record



The Werkspeer Diesel, presumably the type of engine which will go into some of the motorships which it is understood the Shipping Board is to build



Miss Josephine Tynan driving the first pile on the site of the new Liberty Shipbuilding plant at Alameda

in the building of the town commensurate with that established by the Pacific Coast Shipbuilding Company in the construction of its plant, where the first keel was laid less than four months after ground was broken. Six months to a day from the ground-breaking for the yard, four keels were down. The shipyard is building ten 9400-ton d. w. cargo steamers for the government. While it has been actually at work on steamers only since May, its force, constantly growing, was more than 1200 when the housing project was begun.

Clyde is two and a half miles from the shipyard, which is about thirty-five miles east of San Francisco as the crow flies. On one side the townsite is flanked by the main line of the Oakland, Antioch & Eastern Railway's electric system, and by the Clayton Railroad and the concrete highway of Contra Costa county.

The main avenue of the town, already given the name of Trafalgar, will lead from the railroad to a civic center, which has been provided for as part of the beautification scheme. In the latter the lots are also included. The houses are to be in the main of the English style of architecture, adapted to California conditions and varied to give pleasing effects individually as well as unity as a whole. E. W. Cannon of Oakland and G. A. Applegarth of San Francisco are the architects.

A \$75,000 hotel will be put up immediately, as such features as stores, a school, ball grounds, moving picture theatres, lodge rooms, and so forth, will follow as rapidly as possible. The plans have been drawn to make Clyde a complete little city,

modern in all respects, and having the latest systems and equipped in such necessities as lighting, fire protection, sewers, street work, water supply.

The entire scheme has been worked out with special consideration for the requirements of shipbuilders and from the matter of transportation between town and yard down to minor details it will be a shipbuilders' town, made to order.

OLD IRON FOUNDRIES BUSY

The shipbuilding industry's rapid increase in importance has brought new prosperity to the Sierras, and the old iron foundries of the mining country are being kept busy on shipyard orders. The Pacific Coast Shipbuilding Company, which is building ten 9400-ton cargo steamers for the Government at its new Bay Point lard, is getting some of its iron work from these old foundries, although in the work of keeping things running at top speed it has placed orders as far off as El Paso.

In some instances Sierran foundries have been able to underbid those even in the heart of the Alahama ore country. For years the mountain plants have been gathering stores of iron from old mines, sometimes getting it merely for the cost of cartage.

In direct benefit to Contra Costa county from the location of the shipyard on the shores of Suisun Bay is seen in the establishment of the Bay Point Iron Foundry, which is to have a large force. Shipyard orders will give it considerable work.

FIREMAN FUND NOTES

Mr. Chas. R. Thompson, general adjuster of the Fireman's Fund, has returned from his trip through the Northwest.

The growing grain season in California and the Northwest, from an insurance standpoint, was very successful, showing a marked increase over last year's business, notwithstanding the fact that the crop this year was not up to general average in this territory. Fireman's Fund crop agents report that farmers as a rule showed a marked desire to carry insurance on their crops on account of the high prices of grain and fear of fires of an incendiary origin.

A statistical survey of the automobile business transacted during the first six months of this year by the automobile department of the Fireman's Fund Insurance Company justifies the expectation that the total automobile premiums for 1918 will show an important increase over those of 1917, unless production is radically cut down for the remainder of this year. This preliminary showing is very satisfactory, owing particularly to the fact that the Fireman's Fund wrote the largest volume of automobile premiums in 1917 of any company in the United States.

According to Captain Louis Turner, marine surveyor of the Fireman's Fund, and other competent authorities, the temporary repairs made to the "Phyllis", which stranded at Point Vicente, Cal., consisting of 3500 square feet of patches put on the bottom while the steamer was lying close to San Pedro Harbor, was the best job of under-water patching that has ever been brought in San Francisco harbor. The time required for this extensive job was one calendar month.

J. B. Levison, president of the Fireman's Fund, motored to Los Angeles to spend the week-end with his oldest son, John Gerstle Levison, who is stationed at the United States Naval Training Camp at San Pedro. Mr. Levison was accompanied by his wife.

Mr. N. B. Swett, of the firm of Hugson-Swett & Reiss of Fresno, Cal., recently visited the head office of the Fireman's Fund on business. Mr. Swett was formerly special agent of the Fireman's Fund.

The head office of the Fireman's Fund will be well represented in the forthcoming Fire Insurance Men's Golf Tournament, which will take place at the Claremont Country Club on Friday, August 23rd. W. J. Dutton and Bernard Faymonville, former presidents of the Fireman's Fund, and J. S. Levison, present president, together with C. C. Wright and others will ably represent the head office. Already a list of forty-six of the fraternity are entered in the tournament, which promises to be a big success.

The Fireman's Fund has recently dispatched Marine Claims Agent G. Kirkham Smith, together with its general agent, Frank G. Taylor, of Seattle, to Esquimault, B. C., to assist at the salvaging of the valuable cargo of the "Canada Maru", stranded at Cape Flattery on 30th last.

The latest reports from former Fireman's Fund employees have entered the service of their country are as follows: Chester Clarke, lieutenant, American air service, Ellington Field, Texas; Leonard Fischer, Fort Eustice, Va.; Alfred E. Sassus, machinists mate, Naval aviation corps, Gulfport, Miss.; Warren Landon, Camp Fremont, and Chas. Krause, acting sergeant, Camp Lewis.

The board of directors of the Fireman's Fund Insurance Company at their meeting held August 22nd last placed Secretary Louis Weinmann on the retired list as of September 1st, and elected Assistant Secretary H. P. Blanchard to the position of secretary.

Mr. Weinmann has earned his retirement, having served the company loyally and conscientiously for thirty years. He was appointed special agent in 1888; elected assistant secretary in 1892 and secretary in 1900.

Mr. Blanchard requires no introduction to the company's agents and friends. He has spent his entire business career in its service, having gone

from the office into the field as special agent, from which he was called and elected assistant secretary in 1907.

SAN FRANCISCO IN EXHIBIT

San Francisco is to participate officially in the Pacific Coast Land and Industrial Exposition, which opens in Oakland September 9th and will continue until October 6th.

According to J. Cal Ewing, secretary of the organization, Mayor Rolph will appoint a committee immediately for taking charge of the exhibit, which will be a civic one, and will be participated in by the various departments of the city.

San Francisco will occupy space next to Alameda county in the States and counties pavilions.

THE CASUALTY LISTS

How do you read the casualty lists?

Do you begin at the top, turn to the right hand column and scan the heroes by home towns? Or do you look at the names, and, meeting a familiar one, look to the address to see if it is the boy you know, and, if it is, then read the subhead to see his fate?

Perhaps you start with the slightly wounded and read up to the deeper tragedies where you glance gingerly as on dangerous ground, hoping and full of faith that none of the names there will bring you face to face with a supreme sacrifice made by one close and dear to you.

When the list has been read without any start of recognition, you feel happy—but only for a second, because you know that every name represents a splendid American who has given his blood for you here at home. You share the grief and the pride of the folks who know those names with heavy hearts.

Are you worthy of their sacrifice?

You are not worthy if you do not give the best that is in you in backing them up. Those boys were asked to stop the German drive on Paris. They did it, and in addition drove the Huns beyond their starting point toward the Rhine. You are asked to more than double your last Liberty Loan investment, because the government needs at least six billion dollars. Think of that daily casualty list and then dare to put down one cent less than you can afford to invest.



The Howard Terminals, one of the best fitted cargo handling units about San Francisco Bay



Activities in Oregon Ports

OF seventy vessels of the new fleet lying at various points between Portland and the sea, August 15, all having work performed relative to machinery installation or the application of finishing touches, sixty-seven were ships launched since January 1. However, there were others floated during the period that are now at sea, ninety-five being the full list, representing approximately 400,000 tons.

Returning to Portland about the middle of the month, after a few weeks spent in the East, Mr. Jack Helser, of the Helser Machine Works, started the machinery for turning out 500 winches, to be completed at the rate of 65 winches a month, a contract he undertook with the Emergency Fleet Corporation. It is the largest of the kind placed in the Northwest territory. The winches are for steel ships, ten for each vessel.

Mrs. C. D. Bowles of Seattle was a Portland guest August 12, when she christened the steel steamer Western Scout, launched by the Northwest Steel Company. The vessel was the fifteenth to leave the ways there.

Delivery of the steamer Point Adams early in the month, by the Albina Engine & Machine Works, cleared berths at the fitting-out dock, there being no more of that fleet in the water, but five are on the ways and will be launched in close order. The Point Adams will fly the flag of the American-Hawaiian line and no doubt remain in the Pacific trade.

Three times in succession the Grant Smith-Porter yard won a "best progress" pennant in vogue in the Oregon district, and as the Emergency Fleet Corporation decided to have national pennants, the district idea was discontinued. The winner is allowed to keep the flags, which differ from the national pennants, inasmuch as the Oregon award was made up of international signal flags to spell "Best Progress". As the company received the first national pennant, that being for work in June, it drew the following telegram from Director General Schwab:

"Philadelphia, Pa., Aug. 5, 1918.

"Grant Smith-Porter Company:

"The West again made clean sweep of all flags for June, and I wish to offer my congratulations to your company for winning first and second prizes two months in succession. This is fine work and I hope you will keep it up.

(Signed) "C. M. SCHWAB."

When navy tars on the freighter West Coast received a costly talking machine from Miss Helen Smith Besson, through the Red Cross, and were supplied with stationery and all kinds of reading matter by Harbormaster Prehn, they began to doubt if war was all General Sherman alleged. A campaign has been undertaken here to keep the crews entertained at sea and there is no question but that the efforts of the land forces are acceptable.

Women are playing a larger part every month in shipwork in the Oregon district. There are twelve engaged at the Standifer Vancouver wooden yard and three in the North Portland yard of that organization spinning oakum.

Port of Portland Commissioners have determined to proceed with the construction of a coal dock at the St. Johns dry dock property. Steps have been taken in that connection to provide a locomotive crane. The probabilities are fuel will be barged from British Columbia. The Pacific Coast Coal Company is going ahead with the reconstruction of its bunkers, the old plant having been damaged by fire early in the month. The new bunkers will have a capacity of 6000 tons and there will be 5000 tons held in reserve in flat storage.

John W. Doty of New York, vice-president and general manager of the Foundation Company, was a Portland visitor the latter part of the month, making a Western trip in connection with the French High Commission having exercised its option for twenty more steam auxiliary schooners. He also had important business at San Francisco bearing on shore construction work.

Calculations of Alfred F. Smith, head of the Columbia River Shipbuilding Corporation, where the fourth and fifth sets of ways are going in, provide for the first keel going into position on one in September, which is about two months ahead of earlier prognostications. With three ways the corporation has completed eight hulls since 1918 opened and the two extra berths will make an appreciable increase in the production.

Lieutenant Harold C. Jones, of the Oregon Naval Militia, has been named Portland representative of the National Service Bureau of the United States Shipping Board. Already a number of retired skippers in the State have called and registered to return to active life on the briny deep and many former sailors are reporting for war duty.

Hesse-Martin Iron Works have been awarded an order by the Grant Smith-Porter Ship Company for

all deck machinery to go aboard ten Ferris ships. The contract comprises 120 units and delivery is to be completed in three months.

Cheering news from Washington reached vessel owners and commercial interests three weeks ago to the effect that the creation of the Eleventh district of the United States Steamvessel Inspection Service on the Pacific side would leave Oregon with California and the Hawaiian Islands in the present territory. The new zone is to be made up of Washington and Alaska. Oregonians have sought to have such an arrangement carried out ever since a bill was introduced in Congress three years ago, their stand being that as Oregon waters have been served for years by deepwater vessels, either owned or controlled in California, there was more in common between the two States, and whether a matter of sentiment or business they wished it carried out.

G. L. Blair, of San Francisco, general manager of the San Francisco & Portland Steamship Company, spent the forepart of August in Portland on business having to do with the present service. With the liner *Rose City*, the only passenger vessel of the fleet, and the *Blandon*, a government wooden ship, in the Portland-San Francisco freight service, gone are the old days when the *Beaver* and *Bear* were the popular carriers.

Doubt as to the character of vessels to be built for the government at the plant of the Kiernan & Kern Shipbuilding Company was dispelled on the receipt of an official telegram from Philadelphia conveying information that four of the Fred A. Ballin design of composite ship had been closed for. The preliminaries are now under way and as soon as material arrives construction will be begun.

Theodore Knudson, superintendent of the Foundation Company's yard since its establishment in July, 1917, has resigned and is identified with the wooden department of the Standifer corporation. His place has been taken at the former plant by Paul B. Thompson, formerly of the purchasing department of the company's Tacoma plant.

David E. Lofgren, an attorney, who recently returned from Washington, announces that concrete ship construction is soon to be undertaken here and the McNamara system of moulds used. The latter is a pontoon mold operated much the same as a dry dock and can be used for innumerable vessels, so long as it is kept in repair. The Great Northern Concrete Shipbuilding Company is rapidly getting its yard in condition for work at Vancouver, where five vessels will be built for the quartermaster department. Ambrose Scott, treasurer of the company, has returned from San Francisco after closing contracts for five sets of Standard gasoline engines for the vessels.

Machinery is beginning to arrive for the new 1,000,000-bushel grain elevator being erected on the St. Johns municipal terminal property by the Commission of Public Docks. The foundation has been

advanced so that the work of waterproofing that portion is progressing.

One change during the month at the Supple-Ballin yard was the return of J. B. C. Lockwood, one of the original three incorporators of the corporation, who accepted the billet of plant manager. Mr. Lockwood had spent considerable time in Washington on business connected with a 5000-ton steamer Mr. Ballin designed. He was also connected with the Drummond Lighterage Company on Puget Sound, and has severed his connections there so as to devote all his time to the shipyard responsibilities.

In a glass case at the office of J. A. Sim, general manager of the steel plant of the G. M. Standifer Construction Corporation, is contained the first flag raised over the property, the date having been January 27, 1918, when the acreage that now embraces one of the largest and most modern steel plants on the Coast was low and lacking an immense fill and other improvements necessary before plant installation could be commenced. The flag is faded and whipped by the wind, but it has the place of honor for service.

Portland's delegation to the Philadelphia and Washington conferences having to do with the Pacific Coast wage scale change, was made up of Joseph R. Bowles, president of the Northwest Steel Company; James McKinlay, general manager of the Columbia River Shipbuilding Corporation, and Bert C. Ball, president of the Willamette Iron & Steel Works, on behalf of the steel builders, with James B. Kerr, treasurer of the Peninsula Shipbuilding Company; E. W. Wright, vice-president and general manager of the McEachern Ship Company, and James F. Clarkson, general manager of two wooden plants of the Standifer interests, for the wooden constructors.

A bottle message picked up by E. W. Mears on Mapia Island is said by Oscar W. Schwarz, nautical expert in charge of the branch hydrographic office here, who received it, to have been the longest on record. It drifted from April 9, 1914, to June 16, 1918. The message was thrown overboard by Captain P. L. Hanson from the schooner *Kona*, and he lost his life when the ship was wrecked February 3, 1917, on Kangaroo Island, South Australia. The message was dropped into the sea in latitude 1:53 north, longitude 152:50 west, and



Launch of the "Gardner Williams" at the Columbia Engineering Works, Portland.



First keel laying at the G. M. Standifer Corporation yard at Vancouver, Washington, Mr. Pape driving a rivet

Mapia Island is in latitude 0:49 north, longitude 134:17 east. Adrift four years and two months and travelling virtually in a straight line, at least with the currents as charted, is taken by Mr. Schwartz as the best evidence of the accuracy of the hydrographic office charts.

Chief Hull Inspector Hubbard and Chief Draftsman Reed, of the wooden division of the Emergency Fleet Corporation, are in the East in connection with plans for a 5000-ton wooden steamer designed by J. W. Hall, assistant supervisor, and others. The plans will be submitted to the American Bureau and Lloyds for approval before being taken before the experts of the government at Philadelphia. Oregon builders are back of the plans and they hope speedy consideration will be accorded them in the East, so they may lay down the new type in place of the 3500-ton ships now worked on.

Captain William C. McNaught has been formally seated as a member of the Oregon State Board of Pilot Commissioners, succeeding Captain J. Speier, who resigned June 30. Captain McNaught represents the San Francisco Board of Marine Underwriters in the Oregon district and is among the best known deep-water men on the North Pacific Coast.

In line with action taken by San Francisco tug owners having vessels on short runs, the Port of Portland Commission has increased the pay of its deck and fireroom force from \$75 to \$85 a month on the tug Wallula.

That the new steamers Western Pride and Western Scout will be assigned to the Luckenbach Steamship Company is the text of official advices received. It was assumed all of the 8800-ton ships would go to the Navy, so the orders came as a surprise. The Western Comet, Western Maid and Western Plains will fly the Navy flags.

Establishment of offices here by Sudden & Christensen, of San Francisco, is a step toward the operation of some of the new government ships in the Pacific trade. At this time Portland interests are desirous of inaugurating some of the proposed trade routes the Shipping Board has had under consideration and the impression is that Sudden &

Christensen will have much to do with such matters.

A. Reimann, head of A. O. Anderson & Company and vice-president of the Albina Engine & Machine Shops, is home after several weeks spent in the East in the interest of steel ship construction.

Responding to the request of the Shipping Board a port survey has been undertaken by the Commission of Public Docks, to indicate what facilities are to be had here for vessels in the deepwater trade, also for the storage of various commodities.

Fire that broke out aboard the Port of Portland dredge, Portland, the forepart of the month, damaged the superstructure considerably, but the demand for dredges in the interest of shipyard improvements prompted the commission to order the immediate repair of the machine and she will be back in service early in September.

Trial of the new steamer Katia, formerly the John Kiernan, was conducted August 15. She proved all that was expected of her. The vessel was constructed at the Kiernan & Kern yard and before her completion was purchased by French terests. Originally a steam schooner type, the new owners ordered a shelter deck built.

Another block of ground, lying between the east approach of the Morrison street bridge and the Belmont street plant of the Pacific Marine Iron Works, has been leased by the latter and a fourth slip for the accommodation of wooden steamers is being provided. At the East Main street plant the new ships receive their machinery and then shift to Belmont street for the completion of the installation labors. All of the Supple-Ballin ships are fitted out there and contracts are held for sixteen others, the latter representing about \$2,400,000.

The fourmasted topsail schooner Gardner Williams was launched by the Columbia Engineering Works, August 6, Betty Jones, seven-year-old daughter of Mr. and Mrs. Carl R. Jones of this city, essaying the role of sponsor. The vessel is owned by the DeBeers Consolidated Mines Company of Capetown, South Africa, and is 190 feet long, with a beam of 36 feet and depth of hold of 19.8 feet, and is to be delivered early in September.

Delivery of the 4500-ton composite steamer Calala to the Emergency Fleet Corporation August 13 by the Supple-Ballin Shipbuilding Corporation recorded the entry of the pioneer of the type, which was designed by Fred A. Ballin and is equipped with watertube boilers, of which he is the patentee, while the engine was built by the Pacific Marine Iron Works, in which Mr. Ballin is the principal stockholder, so more than passing interest attaches to the future operation of the vanguard from the yard.

On her official trial the Calala made 11¾ knots with ease, and all main and auxiliary machinery was reported to have operated with remarkable smoothness. Five others are in the water and two on the ways will soon be overboard. As a result of a visit to the plant paid by Director General Schwab and Vice-President Piez of the Emergency Fleet Corporation, in July, another set of four contracts was awarded the management and those ships will be laid down as soon as possible.

The Ashburn was launched there August 8, Miss Eleanor Thompson, whose father is superintendent, having started the ship riverward.

Portland Ship Deliveries

CONSERVATION of man power and limited supplies of steel that are said to have largely influenced the decision of Director General Schwab and Vice-President Piez, of the Emergency Fleet Corporation, not to proceed at present with a second shipbuilding plant to be controlled by the Northwest Steel Company, did not deter that corporation from going ahead with a large fitting-out dock with adequate machine shop facilities.

Property has been obtained adjoining the Northwest Company's yard on the north, the frontage being 523 feet and with an additional 100 feet drawn from the company's own holdings, a dock of suitable length will be possible. The dock is to have a width of 150 feet and a modern plant will be built in conjunction with it, the expectation being that in October or November the first vessel will be taken care of there.

The arrangement now is for the Willamette Iron & Steel Works to fit out the 8800-ton freighters until the new facilities are ready for use. After that it is expected the Willamette will accept wooden vessels for machinery installation and probably some other steel ships, while they will continue on an extensive scale with boiler manufacturing and building donkey boilers and auxiliary machinery.

The Willamette has added to its speed at such a rate in the past year that the latest reports show eighteen boilers had been tested during August and probably twenty will be included in the complete check, more than double the output of a year ago.

The company entered into a contract with the G. M. Standifer Construction Corporation early in August to fit out the first six wooden steamers launched at the former's North Portland and Vancouver yards. It is the first time the Willamette's force has been assembled to put driving power into one of the wooden carriers since the European war drew on their facilities, yet such an excellent record has been attained in the fitting out of the big steel freighters that it is felt certain the Willamette's men will be among the leaders in the district in the matter of quick delivery of vessels.

To keep the steel fleet moving as briskly as possible, three slips have been used when machinery was going into place, while a fourth big slip has been obtained from the Commission of Public Docks through permission to use that at the Fifteenth street municipal terminal, where the wooden steamers are to be taken care of for the present.

Deliveries of steel tonnage by Portland plants to the Emergency Fleet Corporation have been satisfactory so far this year. Of the Northwest Steel Company's fleet, in which the Willamette has placed the machinery, 11 had been turned over to the government up to August 15th, while the Columbia River Shipbuilding Corporation had delivered seven of the same type, 8,800 tons, and the Albina Engine & Machine Works had finished six, two of 3,300 tons and four of 3,800 tons.

The following shows important dates from the time of the keel going into place until the vessels were delivered:

Northwest Steel Company

Vessel	Keel	Launched	Delivered
Westward	Feb. 1, '17	Nov. 4, '17	Feb. 4, '18
Westshore	Aug. 3, '17	Ja. 13, '18	April 15, '18
Westland	Oct. 8, '16	Sept. 14, '17	Dec. 26, '17
Westchester	Apr. 4, '17	Dec. 5, '17	Mar. 17, '18
Westhampton	Sept. 17, '17	Feb. 8, '18	May 13, '18
Western Wave	Nov. 5, '17	Mar. 4, '18	June 8, '18
Western Ocean	Dec. 6, '18	Mar. 19, '18	June 18, '18
Western Chief	Jan. 14, '18	April 20, '18	June 30, '18
Western Spirit	Feb. 9, '18	May 6, '18	July 6, '18
Western Light	Mar. 5, '18	May 27, '18	July 29, '18
Western Maid	Mar. 20, '18	July 8, '18	Aug. 15, '18
Western Comet	Apr. 22, '18	July 23, '18	
Western Scout	May 7, '18	Aug. 12, '18	
Westview	May 28, '18		
West Yaquina	June 11, '18		
West Zeda	July 24, '18		

Columbia River Shipbuilding Corporation

Vessel	Keel	Launched	Delivered
Westward Ho	March 26, '17	Nov. 19, '17	Mar. 4, '18
Westbrook	April 26, '17	Jan. 13, '18	Mar. 30, '18
Westgate	May 25, '17	Jan. 27, '18	April 23, '18
West Indian	Nov. 20, '17	Feb. 27, '18	May 22, '18
Westgrove	Jan. 15, '18	Mar. 27, '18	April 26, '18
Western City	Jan. 29, '18	April 30, '18	June 6, '18
Western Coast	Mar. 2, '18	July 6, '18	July 31, '18
Western Plains	May 3, '18	Aug. 10, '18	
Western Pride	Mar. 30, '18	July 20, '18	
Western Belle	June 20, '18		

Albina Engine and Machine Works

Vessel	Keel	Launched	Delivered
Point Loma	April 18, '17	Nov. 3, '17	Mar. 12, '18
Point Arena	April 25, '17	Nov. 29, '17	Mar. 30, '18
Point Bonita	May 29, '17	Mar. 27, '18	June 24, '18
Point Lobos	May 29, '17	April 11, '18	June 30, '18
Point Judith	Nov. 3, '17	May 4, '18	July 27, '18
Point Adams	Nov. 30, '17	May 11, '18	Aug. 12, '18



Keel laying at the Standifer yard, Mr. Sims handling the rivet hammer

The Progress of Shipbuilding

VESSELS actually under construction and contracted for in the Portland District August 15, 1918, a total of 91 wooden ships, 64 steel steamers and five concrete vessels represented expenditures unde way and authorized of \$149,599,990. At points between Portland and Astoria and including one plant at Tillamook, 38 wooden ships were being built or were contracted for, adding \$20,750,000 to the expenditures, a total for the Oregon District of \$170,349,990.

Oregon lands the world in speedy construction of wooden vessels, the record of 49 days building a Hough design hull, of 3,500 tons deadweight capacity, having been attained by the Grant Smith-Porter Ship Company, the vessel being the Caponka, launched April 24, 1918.

A splendid record for steel ships was established March 27, 1918, by the Columbia River Shipbuilding Corporation, when the hull of the 8,800-ton steamer Westgrove was floated, 61 days' work having been required; she was finished in 83 days.

The third wooden hull launched in the United States under the program of the Emergency Fleet Corporation was the Wasco, February 17, 1918, she being a product of the Grant Smith-Porter Ship Company's plant. That firm also won first place in May among the wooden shipyards of the United States for progress made and in June the Columbia River Shipbuilding Corporation was among the steel plants of the country in progress.

A summary of shipwork in the Portland territory, which includes all plants within streetcar radius, shows four steel yards, eight wooden yards and one engaged in concrete construction, employing approximately 40,000 men. In the entire Oregon District, which is exclusive of Coos Bay because the latter port was attached to the California District there are 128 wooden vessels building or contracted for, the aggregate working force being close to 50,000 persons.

Since the revival of shipbuilding in the District, due to the European war, the following indicates what has been accomplished as well as orders to be completed:

Steel Plants	Ships	
	Delivered	Building and contacted For
Northwest Steel Company	12	20
Columbia River Shipbuilding Corp.	7	25
Albina Engine & Machine Works	6	9
G. M. Standifer Construction Corp.	(new)	10
Wooden Plants		
Grant Smith-Porter Ship Co.	8	18
Supple-Ballin Shipbuilding Corp.	3	11
Peninsula Shipbuilding Co.	4	12
Coast Shipbuilding Co.	....	8
G. M. Standifer Construction Corp.	3	20
Kiernan & Ktrn Shipbuilding Co.	1	4
Columbia Engineering Works	6	5
Foundation Company	8	12
Concrete		
Great Northern Concrete Shbldg. Co.	....	5
Outside of Portland— Wooden Yards		
St. Helens Shipbuilding Co.	7	5
McEachern Ship Co., Astoria	8	10
Wilson Shipbuilding Co., Astoria	2	8
George F. Rodgers Co., Astoria	....	5
Fteney & Bremer, Tillamook	....	2



A section of the business office at the Willamette Iron and Steel Works

August 3, 1918, will go down in the archives of the G. M. Standifer Construction Corporation as one of its most notable days, because at 10:05 a. m., that date, the first keel was started of ten steel steamers, each of 9500 tons, that the corporation has undertaken to construct for the Emergency Fleet Corporation. At the same time twenty wooden steamers are under way in the name of these builders, and as six of them took the water July 13, affording Director General Schwab, of the Emergency Fleet Corporation, his first view of a wooden ship leaving the ways.

The laying of the first keel was figured in by Director General Schwab, though he was not present. When he visited the new steel plant July 13, the first plate was ready at a punching machine and he was accorded the distinction of operating it to punch the first hole. So when the plate went into position last month, Fred B. Pape, assistant supervisor of steel ship construction in the Northwest, under Captain J. F. B. Blain of Seattle, was asked to drive the first rivet. That he did in a manner that proved he had not forgotten his earlier training. J. A. Sim, general manager of the steel plant, drove the second rivet, Mr. Standifer playing the role of coach to both, as he considerably declined to play riveter, preferring that the men who are to be responsible for the practical features attend to that. Charles F. Swigert, vice-president, was also on the sidelines, the event of the day being under control of "the boys."

In a week three keels were laid down and the five ways will be busy as soon as all steel material is on the ground. From less than 1500 men, the force is to be added to until there are at least 5000 on the payroll and the building of ten ships, even though the largest yet to be laid down in the Columbia River district, promises to be only a starter for a large fleet.

Mr. Schwab remarked, after going over the property, that at least twenty steamers a year should be produced, which is taken to mean he intends to keep the organization busy.



What the Seattle Shipyards are Accomplishing Today

(By Special Correspondent.)

WHILE Seattle shipbuilders, both wood and steel, participated mightily in the Independence Day splashing of the Kaiser, the forthcoming Labor Day repetition of the event locally will practically be confined to the wood shipyards. At least there will not be as many steel hulls slipped at local plants as marked the July Fourth episode, and this condition is due principally to the delays experienced in delivery of steel.

At this writing it looks as though the Ames Shipbuilding and Dry Dock Company and the Skinner & Eddy Corporation would virtually be the only local steel plants participating in the coming splash, and it is not any too certain that the latter concern will be in the program with more than one contribution, whereas it was hoped that two S. & E. ships would take to the water.

From July 4, when the plant launched two ships, until the second week in August, the J. F. Duthie plant had three of its four shipways vacant simply because the yard could get no steel. This, however, commenced to arrive during the latter part of the month in a satisfactory manner, and Duthie's expect to participate largely in the October launchings. Before this shall have appeared in print, this plant will have launched its last commandeered hull, and the twelfth 8800-ton craft produced by the company for the Emergency Fleet Corporation. Three direct contract ships are now well along in frame, and the fourth shipway will see the starting of another as soon as the last of the requisitioned ships is launched. With steel assured, the Duthie plant promises to average five ships every three months from the four ways.

Returning to the Skinner & Eddy plant, its performance hardly needs a summing up, but the fact that prior to August 20 this concern had delivered twenty-one completed ships of a total deadweight tonnage of 186,000 tons to the United States Shipping Board. Starting with the requisitioning of the Norwegian steamship Jeannette Skinner, completed in August, 1917, the Skinner & Eddy plant has completed to the last minute detail its twenty-first Shipping Board vessel, and the list includes the 10,000 tanker Trontolite. Charles M. Schwab is the authority for the assertion that ship deliveries are what count, and not the mere launching of a vessel. That is the reason Skinner & Eddy is reckoned as the most productive plant in the country. The twenty-one ships completed in toto

and delivered by this concern are: Jeannette Skinner, Lieut. DeMissiessy, Indiana, West Haven, Seattle, Absaraka, Trontolite, West Arrow, Westlake, Canoga, Ossineke, Western Queen, West Durfee, West Lianga, West Alsek, West Apaum, West Cohas, West Ekonk, West Gambo, West Gotomska and West Hobomac. Thirteen of these ships are direct contract vessels, while the other eight were requisitioned contracts.

The August program for Skinner & Eddy calls for but two launchings, and this is due to the fact that the plant is engaged in rebuilding three of the shipways at plant Number 2, and the two other slips at that plant were not completed until about August 1, rendering the additional unit to the big shipyard unproductive during this month. The Skinner & Eddy story in September is expected to be entirely different.

At the Ames plant all is hustle from now on.



Director General of Shipbuilding Charles M. Schwab and J. F. Duthie, head of the J. F. Duthie Shipbuilding Company, taken on the occasion of Mr. Schwab's recent visit to Portland

It was a big relief to the officials of that concern to get the two big oil tankers off the ways during July, and the program now calls for the construction of a long series of standard type freighters upon which the concern hopes to make some speed in building soon. The efficiency of the plant is being increased every day, but it is slow work, since the Ames force was recruited mostly from inexperienced men.

Diverging from the shipbuilding program locally for the moment, it might be said here that the Wilson Shipbuilding Company, a subsidiary of the Ames corporation, has been granted the contract for the hull repairs to the Pacific Steamship Company's liner "Admiral Evans," which lay submerged for nearly two months at Hawk Inlet, Alaska. This is rather an extensive job and the Ames interests have arranged to perform the work at the Winslow plant of the D. W. Hartzell Company, Inc. This contract only calls for the replacing of the damaged steel plates in the ship's hull, the replacing of the woodwork and superstructure not yet having been decided upon. There is some talk in waterfront circles to the effect that the Admiral Line may decide to reconstruct the Admiral Evans as a freighter and eliminate her passenger accommodations, but the absence of General Manager A. F. Haines in the north makes it impossible to confirm this until his return the latter part of the month.

Progress is being made rapidly at the new plant of the Seattle North Pacific Shipbuilding Company, formerly known as the Erickson Construction & Engineering Company. Since its formation the concern has found it difficult to get started thoroughly, and a recent reorganization whereby Twohy Brothers, contractors of Portland and Spokane, and James W. Black, of the Black Construction Company of St. Louis, joined forces with Erickson with a view of firmly establishing the enterprise and pushing the construction of ten 9500-ton steel ships for the United States Shipping Board. Since the coalition the progress has been most noted—four of the five shipways are now the scene of active ship construction, since that many keels have been laid, and the fifth will be placed early in September.

All Seattle wood shipbuilding plants expect to have slipped a wood vessel during August as well as to participate in the coming Labor Day splash, which latter program, as far as these yards are concerned, is expected to eclipse their July Fourth performances by nearly 10,000 tons of ships.

The rapidity with which the Northwestern wood plants are turning out ships is bringing about a serious problem for the United States Shipping Board's sea service bureau, and that problem is how to supply these vessels with engineers qualified to hold the berth as chief.

Already the available waiting list of the bureau has been exhausted, and the frequently issued calls for chief engineers brings only an occasional response, and the vessels are being commissioned



Charles M. Schwab, Mrs. Schwab and Mr. Skinner, photographed during the visit of the Shipping Board party to Seattle

quite rapidly. E. J. Griffith, in charge of the sea service recruiting bureau for this district, is now in Boston conferring with Henry Howard, national chief of the bureau, regarding this problem. Early last spring the bureau feared a shortage of competent masters, but to date there has been no difficulty in securing plenty of navigators to handle the vessels, but the engineer shortage occurred long before it was anticipated. It is estimated here that there will be fifteen wood ships, not to mention the big steel vessels, which will be ready for commission by September 15, and all these must be supplied with a chief engineer. In the case of the steel ships the shortage, while serious, is not so pronounced, since most of these vessels enter the naval auxiliary service and are supplied from the naval reserve personnel.

The Alaska fishing season this year promises to eclipse the big product of last year, at least as far as the Southeastern Alaskan enterprise is concerned. Every liner arriving from Alaska during the past month has reported big runs of fish and a larger pack at the Southeastern Alaskan canneries than for the same period last year, and already the big salmon warehouses here are being called upon to accommodate the packed output from the North.

Since Captain C. P. Magill, for years the Northwestern representative of the Williams, Dimond & Company, answered the call to colors, the affairs of that concern have been turned over to W. C. Dawson & Company. The latter concern is also agent for several lines of coasting vessels and the Osaka Shosen Kaisha. Dawson has recently been named as agent for several of the new Shipping Board's vessels shortly to be commissioned.

The unfortunate death of Captain Y. Yamamota, master of the Osaka Shosen Kaisha liner *Canada Maru*, is genuinely regretted here. The *Canada Maru* ran ashore one mile south of Cape Flattery while inward bound, and Captain Yamamota is presumed to have followed the custom of his race by expiating his error in the time-honored custom of the Orient, though he had been exonerated from all blame. The Osaka Shosen Kaisha has offered

a liberal reward for the recovery of his body, but at this writing all search has proven fruitless. On examination in dry dock at Tacoma the Canada Maru was found to have sustained serious damage to over sixty plates, extending a distance of over 120 feet along her hull. She has been successfully discharged and four-fifths of her cargo is undamaged, or slightly so, if any.

The employes of the various Seattle shipyards, who subscribed a total of \$1,840,000 to the Third Liberty Loan, are engaged in organizing for the forthcoming drive starting in September, and on

this occasion they have adopted the slogan calling for the beating of that mark. In charge of the drive at various plants as named at this writing are: Skinner & Eddy, J. E. Fallon, who was secretary of the Skinner & Eddy Employes' Association for the Relief of Soldiers and Sailors and their families; William R. Jewell, Ames Shipbuilding & Dry Dock Company; H. F. Zila, Patterson-MacDonald Shipbuilding Company, and George R. Markley, Meacham & Babcock Company. George McGillivray, of the State Industrial Division, is assisting the shipyards in organizing for the drive.

New York Port Facilities Expanding

THE port of New York can handle more than twice its present volume of business, according to the New York, New Jersey Port and Harbor Development Commission. Contrary to the impression created by last winter's congestion, the commission officially announces that the studies and investigations already made demonstrate the fact that the capacity of this port for the handling of outgoing and incoming tonnage equals several times the present extraordinary war demands upon our port facilities.

This important official statement of the commission appointed by Governor Whitman and Governor Edge last year and of which William R. Willcox of New York is chairman, and J. Spencer Smith of New Jersey vice-chairman, is based on the broadest and most searching and scientific survey and study of port facilities, of the operations and of the needs of the port of New York that has ever been made.

The importance of the commission's announcement is of particular significance, as it makes absurd the claim being made by interests located in other Atlantic seaports, that the limit of New York's port facilities has been reached. The survey has disclosed the main causes leading to last winter's congestion, which is the basis of all reports alleging that the full capacity of the port of New York has been reached. These causes, Chairman Willcox declares, were due to abnormal weather conditions, lack of steamships, coal shortage, and the absence of anything approaching co-ordination or co-operation in the tremendous shipment of war materials toward the end of last year.

Speaking for the commission, Chairman Willcox said recently at the office of the commission, 115 Broadway, that the port of New York has a water front length of 770 miles, of which 320 miles have been developed. Of the 450 miles remaining for development at least 50 miles are located in almost the exact center of this port.

"The commission has already obtained," said Chairman Willcox, "through its experts and investigators in the field and in the records of the carriers, a large amount of data and information which clearly indicate that the port of New York, if properly developed, will be able to handle several times the amount of freight now entering and leaving the port.

"For the first time this commission will have placed before it correct statements as to the present cost of passing commerce through this port.

"This information is fundamental and it has never been known in the past what these costs were; until these costs are known it is impossible to make an economic proof of the necessities of additional facilities at the port and more scientific methods of conducting commerce.

"All of this work is being performed in the working office of the commission, located at 14 John street, New York City, which is under the direction of the consulting engineer of the commission, B. F. Cresson, Jr.

"The problems presented by this port are more complex and involved and of vastly greater magnitude than those existing in any other seaport.

"We have, for instance, nine trunk lines having separate terminals here. Our system of investigation requires that each of these be studied separately, and our groups of experts, statisticians and inspectors take up one unit after the other and secure first-hand and absolutely authentic records and make checks from the books of the respective railroad or corporation. One of our first steps was to have conferences with presidents and executive officers of the trunk lines and shipping interests using this port.

"We are investigating and resolving into maps, charts and records every other interest affecting port use or the use of its facilities. Our experts are studying truckage freight movements and the causes of delay in handling freight and we have under way a survey to locate a belt line in New Jersey for the interchange of freight outside the congested Hudson River area. Other experts are at work on the electric power situation for interchange of commerce on the New York barge canal; on barge canal terminals; locations for supplemental terminals; on coal bunkering and local coal deliveries. We will also take up inquiries into methods and regulations pertaining to pilotage, stevedoring, weighing public and private ferries, sewerage disposal and the purification of harbor waters, the handling of building materials, the handling of grain, the disposal of municipal wastes, available warehouses, lithorage, markets and the distribution of food products, ice, the methods of financing our commerce and many other elements of the problem.

"The scope of our work comprehends every interest making use of the port. It is therefore national in its importance. I may say, in conclusion, we believe that the Federal government realizes and appreciates the wide range and practical aspects of our investigations."

The Month in Tacoma

THE visit of Charles M. Schwab and Vice-President Charles Piez, of the Emergency Shipping Board to Tacoma was the means of bringing about a better understanding on the part of builders and the government representatives as to just what could be done here in the building line and what the government asked of the builders. All the yards were visited by the heads of the Emergency Board who expressed themselves as greatly pleased with the plants.

Of the greatest moment was the final adjustments of work for the Todd Drydock & Construction corporation plant. Just how much work this steel yard had, has been problematical as contracts have been reported and then apparently dismissed until the management themselves were at a loss as to tonnage to be constructed here. Following a conference between President Todd and Vice-President Piez it was stated by President Todd that the plant here would construct twenty-five 7,500-ton steamships of the Masuda type and three scout cruisers. The extension of the plant as announced some time ago would be carried out involving the expenditure of some \$3,000,000 on improvements. At the present time new work is being carried rapidly ahead. Among the buildings under way are boiler shops, machine shops, the second of the 300 housing hotel units and restaurant to seat 1,400, which is an addition to the present restaurant.

Heavy shipments of whale oil are being received here at the plant of the North Pacific Sea Products Company. This company has orders for 1,000 tons of whale meat from the eastern states. The barge Fresno recently brought 750,000 gallons of whale oil in here which was stored in the new tanks of the firm.

A motion for a new trial has been filed in the federal court here in the case of G. Noots against the St. Paul Fire & Marine Insurance Company. This case was recently tried before a jury in which they returned a verdict in favor of the Insurance Company. The case is involved around the launching of the auxiliary schooner Suzanne at Gray's Harbor in which the vessel stuck on the ways when they sunk and was badly damaged. About \$65,000 is involved in the suit.

Two Ferris type ships from the Seaborn yards here have been turned over to the government by the builders. The Wahkiakum, the last of the ships sailed from here early this month. It is expected that the machinery for the local vessels will be arriving in better shape and consequently installed in quicker time than has been the case with the first two ships turned out.

The tug Echo, of the Foss Launch Company and the Vigilant of the Milwaukee Tug Boat Company were at the stranding of the Canada Maru, of the O. S. K. line at Cape Flattery. The tugs took barges down from here. They stood by until the ship was floated.

President George P. Wright, of the Wright Shipbuilding Company was one of the Tacoma builders attending the meeting of the Macey board in Philadelphia on matters relative to wage questions in the yards here. After this meeting President Wright visited several of the Atlantic Coast yards.

Tacoma's ships launched for July amounted to nine vessels or 38,000 tons. Of this number there were three auxiliary schooners, two steel vessels and the remainder Ferris type ships.

The Ferris ship Wahkiakum, put out by the Seaborn yards underwent successful trial runs recently and has been turned over to the government and will be operated by the Matson Navigation Company. The fitting out of the other vessels here is proceeding more rapidly than the first ships.

Captain L. Gordan, of the Milwaukee Stevedore Company with headquarters in Tacoma spent several days of hard work at the stranded Osaka Shosen Kaisha steamer Canada Maru. M. Higuchi, general manager of the steamship company was also at the wreck.

Captain O. B. Lindholm, of Tacoma has been appointed marine superintendent of the Grace line vessels on Puget Sound and will make his headquarters in Seattle though maintaining his home here. Captain Lindholm is one of the best known navigators sailing out of Tacoma. He has followed the sea for the past 37 years and for 17 years resided on Puget Sound. He has been in the Santa Alicia for the past five years and for three years in the West coast trade. Captain Lindholm has had command of the following old time Hooper vessels; Courtney Ford, Polaris, Americana and John A. Palmer.

Work on an extension of the plant of the Philippine Vegetable Oil Company will be started, it is expected within a few days. The company recently took out a permit for buildings amounting to \$50,000. The company already have extensive tanks and pumping arrangements.

There is a movement among certain shipping interests and members of the transportation board of the Commercial and Rotary clubs to provide more shipping facilities at Tacoma. Just what form this movement will take has not been determined. It is possible that the question of a port district and commission will be put up to the voters again. The port commission was voted down two years ago. It is believed now with the influx of a lot of new blood in the various shipping industries that such a proposition on another election would carry.

During the past two months there have been a number of heads of various shipping firms in town inspecting the port facilities. They declare that while Tacoma has all the natural advantages a port could desire that the business interests must add to this. Like other Sound ports the dock facilities during the past year have been crowded to the utmost. Much cargo has been refused on account of the lack of dock space.

The first cargo of wheat to be received from Australia this season has arrived here. Last year Tacoma had one cargo amounting to 4,000 tons. It is stated that there is an abundance of wheat in Australia but the transportation has been the hindering item. It is believed that the recent action of the Australian government in permitting vessels to sail with a more varied cargo, rather than all wheat will have the effect of moving some of the grain. One vessel was held up six months while the master expected each day to receive sailing orders.

Pyrometers Past, Present and Future

(Continued from page 95)

1890, and this type of pyrometer is still largely used today in bread baking ovens where an accuracy within 50 degrees is sufficient.

The gas or air thermometer, another form of expansion instrument, was the device originally used to determine the true temperature scale, yet it seems strange that it is comparatively recently that this type of instrument has been used to any extent to measure temperature commercially. I have a common form of this instrument here. It consists of a copper bulb containing nitrogen gas, connected to a recording gauge by a very small bore capillary tube, which is protected by a heavy flexible steel tube. The recording gauge contains a spring similar to the Bourbon springs in steam gauges. When the bulb is heated in a furnace the gas inside expands and the pressure exerted along the capillary tube expands the spring in the instrument and causes the pointer to read across the chart or scale. For a temperature of 400 degrees Fahr. the pressure exerted on the spring is about 200 pounds. In consequence, a heavy spring can be used and the instrument is of very robust construction. Temperatures, however, with this instrument cannot be measured above 1000 degrees Fahr. or 450 degrees Cent. Future development work may result in designing an instrument of this type for practical use at temperatures above this.

An early form of temperature measuring device, and one which might seem exceedingly simple, consisted of a pipe which was run through a portion of the furnace, and water passed through this pipe under a constant pressure. Thermometers at the inlet and outlet measured the temperature of the water, and the rise in temperature of the water while passing through the furnace was equivalent to a certain actual temperature in the furnace. The trouble with this form of temperature measurement was the leaks which frequently developed in the pipe, working havoc with the interior of the furnace. While the pipe heated up very little, due to the cool water passing through it, it seemed impossible to obviate leaks entirely.

An instrument used quite largely thirty or forty years ago was the Siemen's water pyrometer. A copper ball weighing exactly 137 grams was placed on a piece of steel in the furnace, and after it had fully attained the temperature, it was quickly removed from the furnace and dropped into a vessel containing a thermometer and exactly one pint of clean water. The rise in temperature of the thermometer in the water could be read off in actual temperature degrees on a corresponding scale. The accuracy of this instrument necessarily depended upon exact measurement of the quantity of water in the vessel and the weight of the copper ball which scales away slowly under heat; also the time taken to remove the ball from the furnace and drop it into the water must vary slightly. An accuracy within about 25 degrees Fahr. was, however, usually attained with this instrument.

The Siemen's water pyrometer is still used today by armor plate manufacturers, as they can readily place a number of copper balls on a piece of armor plate which cannot be easily reached by more improved pyrometers. I noticed one of these instru-

ments in use at the armor plate department of the Bethlehem Steel Company a few days ago.

Optical Pyrometers

There have been a number of different forms of optical pyrometers developed, all of which compare either a light or different colors to that of the piece of steel in the furnace, the temperature of which is to be measured.

Instruments have been developed by Morse, Holburn-Kurlbaum and Wanner in which a bright filament of light is compared with an incandescent background. Mesure and Nouel, the shore pyroscope, the eye-rite, and other similar instruments, compare colored glass or colored substances to the color of the piece in the furnace.

The trouble with all these instruments is that no two operators using the instrument get the same result. They are supposed to help the eye in determining temperature by comparison. They very frequently seem to do more harm than good. Where no other form of temperature measuring device can be satisfactorily used it may be necessary to resort to an optical pyrometer, but they are hardly to be recommended otherwise.

Resistance Thermometers

The principle on which resistance thermometers operate is the change in resistance of metals due to change in temperature. A coil of platinum or pure nickel wire protected with a suitable protecting tube is inserted at a point where the temperature is to be measured, and with a constant source of current passing through the coil of wire the resistance increases or decreases, depending on the temperature. This change in resistance can be easily measured as an adjustable resistance is used to balance the resistance of the bulb, and a galvanometer shows when the balance is reached. The adjustable resistance with sliding contact arm can have a temperature scale for direct reading.

This instrument is an exceedingly accurate one for measuring low temperatures, but is hardly to be recommended for high temperature service. The nickel bulb can be used for temperatures up to 300 degrees Fahr., but above this platinum has to be resorted to, and, in consequence, the bulbs are necessarily very expensive. Furthermore, an outside source of current is necessary with this instrument, and this current must be reasonably constant. Dry-cells, storage batteries or lighting circuits must be utilized. While this form of temperature measuring instrument has been used to some extent for higher temperatures, its chief application is for temperature below 300 degrees Fahr.

Thermo-Electric Pyrometers

For measuring temperatures above 1000 degrees Fahr., the thermo-electric method has come to be by far the most largely used. Possibly some here may not be familiar with the manner in which a thermo-electric pyrometer operates, and it might be well for me to describe this briefly.

A thermo-electric pyrometer consists of a thermo-couple, a measuring device, and the wires connecting the thermo-couple and the measuring device.

If you take two pieces of wire of different materials, for instance, one wire of copper and one of iron, and join one end of the wires together, then heat the junction, you will generate a small cur-

rent of electricity. This is known as thermo-electricity and the wires comprise a thermo-couple.

It is true that the current generated is very small. Wires of precious metals for high temperature measurements, such as one wire of platinum, and the other of 90 per cent platinum, 10 per cent rhodium, generate only ten-thousandths of a volt or 10 M. V. at a temperature of 2000 degrees Fahr. Wires of base metal, such as iron and copper nickel for measuring moderate temperatures, generate several times the voltage of a platinum thermo couple, or about 50 M. V. or fifty-thousandths of a volt at 2000 degrees Fahr.

Experience seems to show that for measuring temperatures up to 200 degrees Fahr. a thermo-couple of bismuth and antimony is best. For temperatures to 1000 degrees Fahr. a satisfactory thermo-couple consists of one wire of iron, the other 60 per cent nickel and 40 per cent copper. For the measurement of temperatures as high as 1800 degrees Fahr. a very satisfactory base metal thermo-couple consists of one wire of 90 per cent nickel and 10 per cent chromium, the other wire 98 per cent nickel and 2 per cent aluminum. The General Motors Company of Detroit have developed a base metal thermo-couple of their own, known as simanial, and its name indicates that this thermo-couple consists of silica, magnesia, nickel and aluminum.

While it is possible for short periods of time to run base metal thermo-couples about 1800 per cent Fahr., for constant service above this a thermo-couple, one wire of which is chemically pure platinum, the other platinum 90 per cent, rhodium 10 per cent, is to be recommended.

Thermo-couples of base metal are manufactured of all diameters running from one-hundredth of an inch up to one-quarter inch wires. Some particular tests require thermo-couple wires of exceedingly small diameter to secure sensitiveness and quick readings. There is no doubt but that heavier wires forming the thermo-couple will increase the life where a base metal thermo-couple is in constant service at temperatures up to 1600 or 1800 degrees Fahr. While a heavier thermo-couple slightly increases the lag, this is not noticeable in heat treating furnaces.

Platinum-rhodium thermo-couples usually are furnished with wires of a diameter of two-hundredth of an inch. I can recollect, however, a thermo-couple of platinum rhodium with wires less than one-hundredth of an inch in diameter, which was used by the manufacturer of Welsbach gas mantels to run up and down over the delicate mantle to determine the hottest point of the mantle. The diameter of these platinum wires must necessarily be small on account of their great value.

If you should wish to make up a base metal thermo-couple and procure a coil of iron wire and another coil of a nickel copper alloy, and make up a number of thermo-couples, and you later procure additional coils of the same wire to reproduce these thermo-couples, you would be surprised to find that the voltage produced by the various thermo-couples might vary as much as 50 degrees Fahr. at a temperature of 1400 degrees Fahr. If you should make up thermo-couples of nickel chromium wire, you would find that these would also vary as much as 30 degrees Fahr., that is, 15 degrees plus or

minus, depending on the particular coils from which the wire was cut.

For a long time we attempted to duplicate the wire in order to procure thermo-couples which would reproduce the voltage of the previous thermo-couples, but this gave an excessive amount of trouble, and no great precision could be secured. Several years ago we adopted the policy of shunting each thermo-couple with magnanin wire, reducing the voltage at the terminals of the thermo-couple about two millivolts. Each thermo-couple is adjusted in an electric furnace to a standard, and a maximum error of one-tenth of a millivolt or four degrees is permitted. In this way a thermo-couple as sent out produces a definite voltage within 4 degrees Fahr., and we are not subjected to the trouble of endeavoring to reproduce exactly the voltage produced by each coil of thermo-couple wire. This method of shunting the thermo-couple also permits of the customer re-standardizing it at intervals. He can take the thermo-couple in constant service and check it up once a month or oftener in an electric furnace in comparison with a standard thermo-couple, and if the voltage has fallen off slightly, he can readjust the shunt accordingly. Instead of scrapping the thermo-couple, as in the past, because the voltage has fallen off slightly, it can be used again after adjustment.

Some other thermo-couples have resistance wire placed in series with the one side of the thermo-couple. I think this method is disadvantageous, since the resistance will only operate satisfactorily where the thermo-couple is used with instruments of exactly the same resistance, and they must be of low resistance. With the shunt method the voltage produced at the terminals of the thermo-couple will be the same whether used with a high or low resistance instrument.

This method of shunting thermo-couples has not been adopted with thermo-couples of precious metals, such as platinum and rhodium. This wire is supplied from uniform ingots and reproduces the voltage of previous melts. It would be desirable to have a shunted rare metal thermo-couple to permit re-standardizing after continuous service. The platinum thermo-couple, however, generates so little voltage at best that there is none to spare to permit of shunting the voltage produced by the thermo-couple.

The wires forming a thermo-couple must be insulated from each other throughout their length. This insulation must withstand high temperature, must be a good insulator, and must withstand reasonably severe handling. A common method of insulating base metal thermo-couples is to wrap these with asbestos and paint the asbestos winding with a solution of sodium silicate. Another method is to fit lava or porcelain beads over the thermo-couple wire, and I consider this a better form of insulation, as it does not disintegrate as rapidly as the asbestos insulation. For the platinum thermo-couple the insulation must be of porcelain or high-grade fire clay, free from impurities.

The life which will be obtained from any thermo-couple installed in a furnace will very largely depend on the protecting tube over the thermo-couple. For temperatures up to 1200 degrees Fahr. a high-grade wrought iron tube gives satisfactory results. The life of this tube can be increased by calorizing, a process recently developed by the

General Electric Company, which impregnates the pipe with an aluminum oxide. This will increase the life of the pipe about three times where used at temperatures around 1400 degrees Fahr.

Tubes of nickel chromium give excellent results for temperatures as high as 1800 degrees Fahr., and they are to be recommended for the protection of base metal thermo-couples where the temperature exceeds 1200 degrees Fahr. Their cost is many times higher than the ordinary wrought iron pipe. It is about four times as much as calorized pipe, but their increased life would well justify the first increased cost.

Platinum thermo-couples must always be protected with a tube which is impervious to gases, such as tubes of porcelain, quartz or alundum. Quartz tubes have a softening point at about 2400 degrees Fahr., but for temperatures below this they are the most satisfactory, as they will withstand sudden changes in temperature without breakage. Above 2400 degrees Fahr. it is essential to use a tube of porcelain or alundum, and these tubes should preferably be protected with an extra fire brick or graphite tube, to prevent breakage of the porcelain or alundum tube with sudden changes in temperature. The fire brick or graphite tubes simply increase the lag slightly, but increase the life of the tubes and thermo-couples.

It is one of the properties of a thermo-couple that the voltage which it generates is dependent on the difference in temperature of the hot junction, that is, the one placed in the furnace, and the cold junction, which is the point at which the alloy wires of the thermo-couple join the copper leads of the instrument. It is therefore particularly important that the cold junction be maintained at a constant temperature, for if a base metal thermo-couple is in use, and this cold junction increases in temperature ten degrees, the decreased voltage generated by the thermo-couple will cause the instrument to read ten degrees lower. If the cold junction decreases, the pyrometer will read higher to the same extent.

Until a few years ago no particular care was taken to take care of the source of error caused by changes in temperature at the cold junction of the thermo-couple. In recent years, however, it has been customary to run compensating leads of the same material as the thermo-couple to a distant point, where the temperature is uniform, instead of having the cold junction, just outside the furnace wall, where it might vary several hundred degrees. These compensating leads in duplex form with asbestos insulation can be run into a pipe driven into the ground, ten or fifteen feet, where the temperature will remain constant within five degrees, winter or summer. From my experience I consider this the best method to take care of cold junction temperatures, as it only takes a few hours to drive a piece of pipe into the ground, pointed at the lower end, and when once installed there is nothing to give trouble with this method.

It has been common practice to maintain the cold junction at as nearly a constant temperature as possible by running water around the cold junction. This maintains the temperature at that of running water, which unfortunately may vary at least twenty to thirty degrees from winter to summer. This method has been very largely abandoned lately, and is hardly to be recommended.

Where it is impossible to place the cold junction

in the ground, on account of the furnaces being on an upper floor of a building, a compensating box can be used, consisting of a lamp and thermostat, which will maintain the temperature constant within two degrees. These compensating boxes can be supplied to maintain the cold junction constant for any temperature from 50 to 150 degrees. The temperature for which the compensating box is set must necessarily be higher than the atmospheric temperature of the room in which it is located.

Some pyrometers are supplied now with resistance which is cut in or out by a switch to adjust by hand for the actual temperature of the cold junction at the end of the compensating leads. No matter what type of pyrometer is used in connection with a thermo-couple and compensating leads, the instrument must be adjusted for the actual temperature of the cold junction of the thermo-couple, whatever this may be, and the instruments have a zero adjuster to permit of adjusting the pointer for the correct cold junction temperature.

There are two distinct methods of measuring the voltage produced by a thermo-couple, i. e., the millivoltmeter method and the potentiometer method.

The Millivoltmeter Method

This instrument consists of a permanent magnet with its pole pieces, in the field of which a copper wound coil swings in jeweled bearings. Instruments of the millivoltmeter type were in extensive use commercially abroad, and to some extent in this country, as much as twenty years ago, but the instruments were of such delicate construction as to be hardly suitable for general commercial use. Usually the instruments were supplied with the moving coil hung between fine wire suspensions, and they were liable to be easily broken through jars or handling in transit. These instruments were of high resistance, approximately 300 ohms.

On account of the delicate construction of this type of imported instrument, a standard form of switchboard millivoltmeter, frequently used as an ammeter, came into extensive use about 1905, and these instruments are still used today. The instrument has a resistance of about five ohms, and each individual instrument must be calibrated for a thermo-couple of a certain length and for use with leads or wiring of a definite length. Slight changes in resistance, due to changes in the length of the thermo-couple, or length of the wiring, naturally affect the indications of the instrument, as the internal resistance of this type of millivoltmeter is so low. Serious errors are also liable to occur due to atmospheric changes in temperature along the wiring, which naturally affect its resistance. Actual tests show that with a low resistance millivoltmeter of five ohms, an atmospheric change in temperature from 50 to 100 degrees Fahr. along fifty feet of wiring from the thermo-couple to the instrument, will make the galvanometer read 18 degrees low. It is impossible to procure great accuracy with this type of instrument.

In the last few years it has been possible to develop a high resistance millivoltmeter, which for all practical purposes overcomes this trouble entirely. High resistance pyrometers of 300 ohms can be made today with pivoted jeweled bearings, and of robust strength construction to meet ordinary shop conditions, and an internal resistance of 300 ohms as compared with five ohms, for the low resistance pyrometer, will reduce to one-sixtieth the errors of low resistance instruments. A change in the a'

mospheric temperature along the wiring of 50 degrees Fahr., producing an error of 18 degrees Fahr., in a low resistance pyrometer of five tons, becomes one-third of a degree where you have a resistance of 300 ohms. The millivoltmeter directly reads the temperature across the scale, and is calibrated in actual temperature degrees. It indicates the temperature from zero to the maximum scale range, and it relies entirely on the voltage of the thermo-couple for its operation. No outside sources of current are necessary.

In this method of temperature measurement, the electro-motive force produced by the thermo-couple is measured by opposing to it a known variable electro-motive force, usually that of a dry cell contained in the instrument, so that when a balance is reached, no current flows. A galvanometer is used to indicate the point at which no current is flowing, and the pointer on the galvanometer then indicates zero, the voltage of the thermo-couple being opposed to the dry cell.

The resistance of the current from the dry cell to the galvanometer in the instrument is very small and constant. After the thermo-couple voltage has been opposed to the voltage of the dry cell and balanced in the potentiometer, the actual measurement is that of the dry cell circuit; hence, this measurement is entirely independent of the resistance of the circuit, including the thermo-couple, lead wires and galvanometer. As a consequence, compensating leads can be run to the instrument 500 feet distant if desired. Changes in resistance of the various parts of the circuit, due to changes in the length, or atmospheric changes, will not affect the indications.

The advantage of the potentiometer method of measuring temperature is in its extreme precision and its independence of resistance changes throughout the thermo-couple circuit. It has the disadvantage as compared with the millivoltmeter method that it is not direct reading, and that some outside source of current, a dry cell, for example, is necessary as a source of current to oppose the thermo-couple, and this dry cell must be replaced from time to time.

Radiation Pyrometers

The radiation pyrometer is a development of the thermo-electric pyrometer. Instead of placing the thermo-couple inside the furnace, where the temperature would be so high as to destroy it, it is placed in the back of a tube in front of a mirror. The rays or heat from the furnace enter the tube and strike the mirror and are brought to a focus on the thermo-couple junction. This attains a heat of only 200 or 300 degrees.

This instrument has a particular field where temperatures must be measured from 2800 degrees Fahr. up, and it is possible to secure an accuracy within one to two per cent with this type instrument, if the instructions as to its use are properly carried out. It is not recommended for service where a thermo-electric pyrometer with base metal or platinum thermo-couple can be used.

Methods of Standardizing Pyrometers

It is very essential, if accurate results are to be secured from pyrometers, that they be re-standardized at frequent intervals. If a thermo-couple is installed in a furnace and allowed to run for six months without being retested, sooner or later it will fail, and the user will find he is away off in

his temperatures. This is simply caused by the falling off in the voltage of the thermo-couple with continuous usage. It is therefore of particular importance that the thermo-couples, whether base metal or platinum, be checked at frequent intervals. The frequency depends on the precision necessary in the work and the equipment available. Some plants make a point of checking their thermo-couples once a week, but it is advisable if this can be done at least once a month.

This checking can be very satisfactorily done by maintaining a standard platinum thermo-couple used for checking secondary standards of base metal. An electric furnace should be used not less than 10 inches deep so that a base metal thermo-couple can project at least 6 or 8 inches inside the furnace. The base metal thermo-couple can be tied together with asbestos string to the standard thermo-couple, with the junctions almost touching each other. The thermo-couples should never be tested in their protecting pipe. A base metal thermo-couple should never be tested in a furnace with an insertion of less than 6 inches, for the reason that the cross section of the thermo-couple wires is large, and the outer end of the thermo-couple wires in the cold air conduct the cold along the wires into the furnace and will reduce the indications at the thermo-couple junction on this account. The temperature of an electric furnace should be maintained constant for at least fifteen minutes before a reading is taken, and the tests should preferably be made at the working temperature of the thermo-couple.

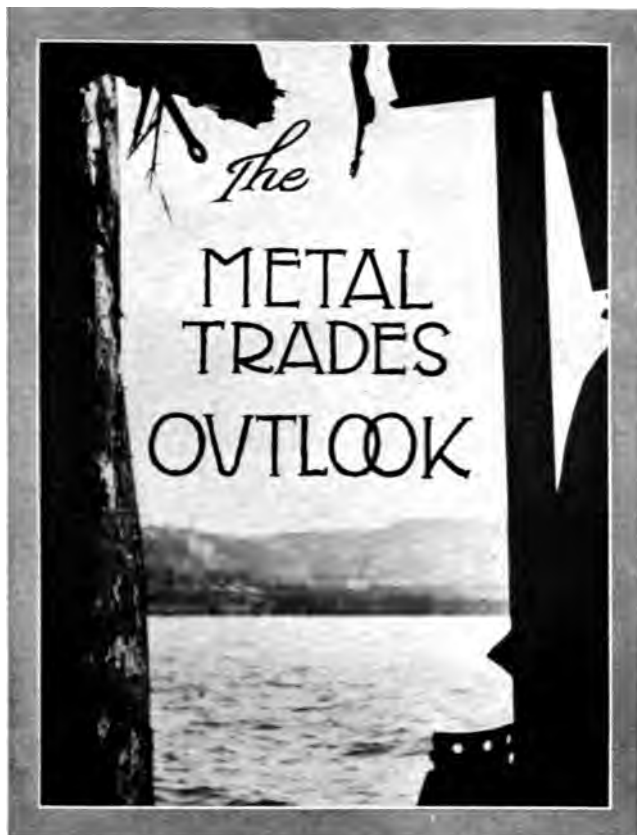
If the thermo-couple under test reads low, and it has no adjustable resistance, it will have to be junked. If it is furnished with a resistance for adjustment purposes, this adjustment can be easily made with a soldering iron.

The freezing point of pure salt is an excellent method of testing thermo-couples, or of the complete pyrometer, consisting of the thermo-couple, leads and instrument. Insert a thermo-couple in a small crucible containing pure salt; ordinary table salt is satisfactory, and heat the salt to about 1600 degrees Fahr. Remove the crucible from the heat and allow it to cool off. At the freezing point of the salt, which will be indicated by the temperature remaining reasonably constant for four or five minutes, the pyrometer should read 800 degrees Cent. or 1474 degrees Fahr.

The melting point of a number of different metals is quite satisfactory for the checking purposes. The metals most generally used for this purpose, and their melting points follow:

Tin	450 degrees Fahr.
Zinc	787 degrees Fahr.
Silver	1761 degrees Fahr.
Gold	1945 degrees Fahr.

The Bureau of Standards at Washington is in good position to test pyrometers and thermo-couples for manufacturers in this country, and it is a good plan to have a standard platinum or base metal thermo-couple tested at the Bureau of Standards, and they can furnish the millivolt values for the thermo-couple. This can be retained as a primary standard to test the secondary thermo-couple. The cost of such a test by the Bureau of Standards is usually about \$10, and the expense is well warranted.



CONDITIONS IN THE BRITISH METAL MARKET DISCUSSED

ON July 31st, *Syren and Shipping*, a British contemporary, had the following to say regarding the condition of the iron and steel markets in Great Britain:

"At the week-end no decision relative to the result of the negotiations between the respective trades and the iron and steel controller has been communicated to those chiefly interested. In the meantime an inspection of the books is to be made, in order to ascertain the effect on working costs of the advance in the price of coal and coke. If the views of leading firms throughout the country are of any value, an all-round adjustment of maximum prices and subsidies is absolutely necessary, if work is to be carried on without actual loss. Midland and Staffordshire ironmasters are very hopeful that the advances granted to the Cleveland makers in respect of exports will also be extended to their districts. They are also agitating for increased subsidies for home markets. The finished iron and steelmakers have likewise put in a claim for consideration, a not unreasonable proposal, if we have regard to the steady increase in the cost of production. There is another very live consideration which is causing great anxiety, to-wit, the acute shortage of coke at all the chief manufacturing centers. Foundry iron is none too plentiful; on the other hand, there is an ample supply of forge qualities. Heamtite pig iron, more especially North-East Coast brands, is procurable in larger tonnage than at any time since the war started. The output of basic pig is also considerably larger, so that consumers of steel, particularly in the Midlands and in the Cleveland district, are relieved of much of their recent anxiety about supplies. With produc-

tion booked up well into the last quarter of the year, finished ironmakers are quite independent of new business. Steelmakers occupy the same fortunate position. The growth of the aircraft industry is the outstanding feature of the extraordinary situation created by the war. Its activity and development will rather increase after the war. Work is now fully resumed in Scotland, whose all departments of the metallurgical and constructive trades have a long spell of increased activity ahead of them. In South Wales the tinplate trade is working under heavy pressure, and the rail and bar mills, as also the furnaces, are behind with deliveries. Tin gained another £12, making the quotation £380, or within a few points of the record price paid earlier in the year. Copper rose another 2 cents per pound in New York, but made no move here."

Ways and means of increasing steel production have been carefully studied, but coal and coke labor is still the key, rather than extensions of rolling mill capacity. So far as the latter is concerned, probably 1,000,000 tons more will be ready by January 1, chiefly in plates, but partly in large rounds, the Steel Corporation now having a \$750,000 mill for this purpose under construction in the Pittsburgh district. The coal situation is far from satisfactory and warning of an impending fuel famine during the coming winter has been issued within the last few days.

The United States Fuel Administrator issues the following order:

"United States Fuel Administration,

"Washington, D. C., June 27, 1918.

"It appearing to the United States Fuel Administrator that various additional regulations should be put in force for the better control of the distribution of coke, and the prices at which the same may be sold,

"The United States Fuel Administrator, acting under authority of an executive order of the President of the United States, dated August 23, 1917, appointing said administrator, and of subsequent executive orders, and in furtherance of the purpose of said orders and of the act of Congress therein referred to and approved August 10, 1917,

"Hereby orders and directs that until further or other orders of the Fuel Administrator, and subject to modification by him at any time and from time to time hereafter, the following regulation additional to those already set forth shall be in effect beginning at 7 a. m., June 28, 1918.

"The maximum price f. o. b. cars at ovens, per ton of 2,000 pounds for 72-hour selected foundry coke made in beehive ovens at the plant of the Newcastle Coal Company, at Newcastle, in the county of Jefferson, in the State of Alabama, shall be eight dollars and twenty-five cents (\$8.25).

"The expression '72-hour selected foundry coke' shall cover only coke selected in accordance with the usual trade practice for foundry use, and the price named for 72-hour selected foundry coke shall in no case be charged for any shipments to blast furnaces for smelting iron or other metal.

"H. A. GARFIELD,

"United States Fuel Administrator."



The importing and handling of vegetable oils which generally consist of such products as cocoanut, soya bean, china wood, china nut, cottonseed, hemp and rape seed, peanut, olive, palm and other oils, is fast becoming a highly important industry on the Pacific Coast. That the long-felt want of facilities for handling these products is fast being overcome is evidenced by the illustration herewith. The exterior appearance of a vegetable oil storage tank is no different from the usual petroleum container and an uninformed person might pass many times the tanks of W. R. Grace and Company, opposite Pier 46.

On San Francisco Bay there is at the present time a total storage capacity of 22,950 tons—13,800 of which are in San Francisco. The locations are as follows:

W. R. Grace and Company, San Francisco, 4,800 tons.

Pacific Oil and Lead Works, San Francisco, 3,000 tons.

Philippine Vegetable Oil Company, San Francisco, 6,000 tons.

W. P. Fuller and Company, South San Francisco, 1,650 tons.

Clements and Sons, Oakland, 3,500 tons.

Pacific Oil and Lead Company, Richmond, 4,000 tons.

There are under construction or planned at the present time, tanks in various locations to accommodate 26,000 tons which when completed will make a grand total of 48,950 tons for the vicinity of San Francisco.

In February and March of this year at Seattle there were available, for vegetable oil storage, tanks having a capacity of 16,500 tons. There were under construction at that time 2,250 tons of capacity, making a total of 18,750. It is not probable that the future planned construction in Seattle will outstrip that of San Francisco.

In addition to the storage facilities on the Peninsula, there is an enormous volume of barrel and case shipments of oil to this port being handled at China Basin by the Breck Mitchell Company. While this business has been heretofore handled without a high degree of efficiency there is now being constructed in this location a well arranged plant to handle this class of goods and will be capable of handling one-half million cases at a time. The plant is being equipped with an inclined apron to permit of trucking from lighters to the storage yard which is floored with concrete and equipped with drains for collecting any oil which may leak out of the cans. There are two large dumping tables, each having a capacity of 500 cans and equipped with steam pipes for heating the heavier kinds of oil. The plant will be equipped with a boiler and oil pump to convey the oil direct to tank cars, which, under present conditions can

be loaded at the rate of two cars an hour. The plant is so arranged and located that its capacity can be indefinitely extended and increased. There is immediately adjacent additional channel frontage and land for storage purposes with spur tracks already constructed and available in case a larger plant is required to handle the business.

Altogether, with the facilities for handling bulk goods from ship to tank and from tank to car and with the well planned equipment for the receipt of importations in cans and barrels to be transformed into bulk goods and loaded in tank cars, the port of San Francisco is fast becoming prepared to ing eastward across the Pacific.

TO CONTINUE THROUGH EXPORT BILLS OF LADING

It has been decided, after due deliberation, to continue the issuance of through export bills of lading via Pacific Coast ports after September 30.

Announcement was made that through export bills of lading would be discontinued September 30, due at that time to the shortage of shipping space and resultant congestion at Pacific Coast ports, which worked a decided hardship on the rail lines and slowed up their handling of war traffic.

Conditions have since improved, and it has now been decided that after surrounding the issuance of through bills of lading with certain reasonable rules to protect and relieve the carriers of the present burdens, the arrangement can be continued.

Announcement will be made to the public in the near future as to the new rules.

COPRA IMPORTATIONS

Figures compiled by the National City Bank of New York show that the quantity of copra brought into the United States in the fiscal year 1918 just ended was approximately ten times as much as in the year before the war. From a modest 55,000,000 pounds in the fiscal year 1914, all of which preceded the war, the figures grew to 90,000,000 pounds in 1915; 110,000,000 in 1916, 247,000,000 in 1917, and about 530,000,000 pounds in 1918.

The tropical sections of the whole world are being ransacked for the cocoanut, and the imports into the United States are drawn from more than thirty countries and islands, representing every grand vision of the globe. Oceania is by far the largest contributor and our own Philippine Islands supplied nearly one-half of the approximately 550,000,000 pounds entering the United States in the fiscal year 1918.

The recent orders of the government upon this subject again permit the importation of all copra except that classed as "shredded" desiccated or prepared," which has formed in the past but an extremely small proportion of the copra imported into the United States. The quantity imported in 1918

of this class, which is still excluded, was but about 20,000,000 pounds out of a grand total of 550,000,000 pounds imported.

Even this tremendous increase in the importation of copra tells only a part of the story of the increased demand for the product of the cocoanut. The quantity of cocoanut oil imported has also rapidly increased, from 74,000,000 pounds in 1914 to about 250,000,000 pounds in 1918, and of this our Philippine Islands also contributed more than half.

The United States apparently consumed in the fiscal year 1918 the product of more than 2,000,000,000 cocoanuts. Accepted authorities indicate that one pound of copra represents the meat of

three average sized cocoanuts, and as the importation of copra for the year is about 550,000,000 pounds and of oil about 250,000,000, the total number of nuts represented by these two importations would be approximately 2,400,000,000 cocoanuts, while the number of nuts imported in the natural state from foreign countries and our own islands during the year amounted to about 100,000,000, bringing the total of the nuts represented by these three classes of imports up to approximately 2,500,000,000 against about 500,000,000 in 1914. The value of the cocoanuts, copra and cocoanut oil imported in 1918 is about \$60,000,000 against approximately \$12,000,000 in 1914.

Analysis of Exports and Imports, Port of San Francisco, Years Ending June 30, 1917 and 1918

Compiled by Foreign Trade Department, San Francisco Chamber of Commerce

Exports				Imports			
Country	1917	1918	Inc. or Dec.	Country	1917	1918	Inc. or Dec.
EUROPE:				EUROPE:			
Austria	\$ 87,355	\$ 87,355	Dec.	Austria-Hungary	\$ 3,900	\$ 3,900	Dec.
Denmark	635,258	635,258	Dec.	Denmark	67,665	55,235	Dec.
Finland	36,488	36,488	Dec.	France	646,546	437,885	Dec.
France	320,801	1,654,275	Inc.	Germany	10,135	4,048	Dec.
Norway	1,522,812	1,522,812	Dec.	Greece	5,380	5,380	Dec.
Russia in Europe	3,293,669	169,692	Dec.	Italy	1,082,071	302,164	Dec.
Sweden	904,282	904,282	Dec.	Netherlands	56,987	184,927	Dec.
England	7,483,830	4,446,981	Dec.	Norway	60,536	11,837	Dec.
Scotland	3,483	297,083	Dec.	Portugal	65,832	52,771	Dec.
Ireland	339,689	339,689	Dec.	Russia	835	835	Dec.
TOTAL EUROPE	\$ 14,629,676	\$ 5,568,612	\$ 8,061,064 Dec.	Spain	63,269	57,616	Dec.
NORTH AMERICA:				Sweden	368,278	283,062	Dec.
Canada	\$ 6,155,387	\$ 7,835,392	\$ 1,680,005 Inc.	Switzerland	53,838	5,530	Dec.
Newfoundland	235	235	Inc.	England	1,180,210	547,433	Dec.
TOTAL NORTH AMERICA	\$ 6,155,387	\$ 7,835,627	\$ 1,680,240 Inc.	Scotland	299,675	153,298	Dec.
WEST INDIES:				Ireland	132,243	70,508	Dec.
Cuba	\$ 667,807	\$ 534,170	\$ 133,637 Dec.	TOTAL EUROPE	\$ 4,142,225	\$ 2,025,434	\$ 2,116,791 Dec.
Jamaica	2,540	2,540	Dec.	NORTH AMERICA:			
Other British	125	103,902	103,777 Inc.	Canada	\$ 1,720,791	\$ 2,367,478	\$ 646,687 Inc.
Santa Domingo	5,400	5,400	Inc.	TOTAL NORTH AMERICA	\$ 1,720,791	\$ 2,367,478	\$ 646,687 Inc.
Trinidad and Tobago	2,814	8,400	5,586 Inc.	WEST INDIES:			
Haiti	3,750	3,750	Inc.	Cuba	\$ 168,514	\$ 162,076	\$ 6,438 Dec.
TOTAL WEST INDIES	\$ 673,326	\$ 655,772	\$ 17,554 Dec.	Jamaica	10,283	9,535	Dec.
CENTRAL AMERICA:				Trinidad and Tobago	45,511	38,978	Dec.
Costa Rica	\$ 309,375	\$ 143,131	\$ 166,244 Dec.	TOTAL WEST INDIES	\$ 225,296	\$ 210,589	\$ 14,707 Dec.
Guatemala	879,631	1,023,335	143,704 Inc.	CENTRAL AMERICA:			
Honduras	368,178	219,830	148,348 Dec.	Costa Rica	\$ 806,678	\$ 869,496	\$ 60,818 Inc.
Nicaragua	697,105	641,539	55,566 Dec.	Guatemala	4,394,343	3,567,899	826,444 Dec.
Panama	1,490,456	971,206	517,250 Dec.	Honduras	1,545	45,517	Inc.
Salvador	1,216,254	1,028,143	188,111 Dec.	Nicaragua	731,724	2,180,405	1,448,681 Inc.
Mexico	4,579,113	4,822,019	242,906 Inc.	Panama	46,273	117,601	71,328 Inc.
TOTAL CENTRAL AMERICA	\$ 9,559,312	\$ 8,949,865	\$ 709,507 Dec.	Salvador	3,815,053	4,782,026	966,973 Inc.
SOUTH AMERICA:				Mexico	2,019,151	2,741,500	722,349 Inc.
Argentina	\$ 101,816	\$ 101,816	Inc.	TOTAL CENTRAL AMERICA	\$ 11,616,765	\$ 14,324,444	\$ 2,707,679 Inc.
Bolivia	226,280	669,964	443,684 Inc.	SOUTH AMERICA:			
Brazil	275	275	Inc.	Argentina	\$ 6,965	\$ 3,768	\$ 3,197 Dec.
Chile	4,021,075	3,612,859	408,216 Dec.	Brazil	401,823	1,285,620	783,797 Inc.
Colombia	140,436	90,721	49,715 Dec.	Chile	2,818,197	3,376,721	558,524 Inc.
Ecuador	282,007	17,434 Dec.	17,434 Dec.	Colombia	3,584	2,360 Dec.	2,360 Dec.
Guatemala	5,063	16,843	11,780 Inc.	Ecuador	682,104	845,172	163,068 Inc.
Paraguay	1,100,519	1,114,555	14,036 Inc.	Peru	50,448	205,487	155,039 Inc.
Peru	1,213	1,213	Inc.	Venezuela	69,358	69,358	Inc.
Venezuela	1,213	1,213	Inc.	TOTAL SOUTH AMERICA	\$ 3,835,121	\$ 5,787,230	\$ 1,952,109 Inc.
TOTAL SOUTH AMERICA	\$ 5,776,593	\$ 5,873,560	\$ 96,967 Inc.	ASIA:			
ASIA:				Aden	\$ 1,229	\$ 1,229	Dec.
Aden	\$ 892	\$ 892	Inc.	China	23,177,385	20,243,481	2,933,904 Dec.
China	1,214,693	1,409,547	194,854 Inc.	Japanese China	180,000	581,107	401,107 Inc.
British India	4,700	4,700	Inc.	British India	4,700,330	23,232,432	18,532,102 Inc.
German China	19,393	19,393	Inc.	Straits Settlements	14,095,350	36,560,209	22,464,859 Inc.
Japanese China	1,617,227	686,818 Dec.	930,409 Dec.	Other British East Indies	617,521	4,600,205	3,982,684 Inc.
French China	246	246	Dec.	Dutch East Indies	18,294,183	43,063,161	24,768,978 Inc.
China	441,528	196,472	245,056 Dec.	Japan	37,080,587	33,456,803	3,623,784 Dec.
British India	1,642,618	2,596,800 Inc.	954,182 Inc.	Russia in Asia	85,419	11,217	74,202 Dec.
Straits Settlements	1,851,740	3,306,722	1,454,982 Inc.	Siam	30,756	6,035	24,721 Dec.
Other British East Indies	306,760	227,231	79,529 Dec.	TOTAL ASIA	\$ 98,279,446	\$171,354,650	\$ 73,075,204 Inc.
Dutch East Indies	5,337,412	10,481,701	4,944,289 Inc.	OCEANIA:			
French East Indies	102,227	219,128	116,901 Inc.	Australia	\$ 7,101,194	\$ 17,547,595	\$ 10,446,401 Inc.
Hongkong	3,056,380	5,394,320	2,337,940 Inc.	New Zealand	1,818,730	3,222,210	1,403,480 Inc.
Japan	42,879,236	84,597,074	41,717,838 Inc.	Other British	1,120,196	2,642,358	1,522,162 Inc.
Russia in Asia	9,861,090	392,984	9,468,106 Dec.	French Oceania	1,498,958	2,375,051	876,113 Inc.
Siam	215,490	670,657	455,167 Inc.	German Oceania	648,849	886,477	237,628 Inc.
Persia	18,298	18,298	Inc.	Philippines	11,818,697	44,262,332	32,443,635 Inc.
Portuguese East Indies	3,404	3,404	Inc.	TOTAL OCEANIA	\$ 24,006,604	\$ 73,036,023	\$ 49,029,419 Inc.
Turkey in Asia	108,920	108,920	Inc.	AFRICA:			
TOTAL ASIA	\$ 77,235,398	\$122,009,018	\$ 44,773,620 Inc.	Egypt	\$ 808	\$ 1,557	\$ 749 Inc.
OCEANIA:				Canary Islands	808	808	Inc.
Australia	\$ 9,835,072	\$ 19,313,149	\$ 9,478,077 Inc.	TOTAL AFRICA	\$ 808	\$ 1,760	\$ 952 Inc.
New Zealand	4,648,849	7,903,173	3,254,324 Inc.	GRAND TOTAL			
Other British	150,283	402,733	252,450 Inc.		\$144,027,042	\$269,107,408	\$125,080,366 Inc.
French Oceania	985,433	1,192,634	207,201 Inc.	TOTAL EXPORTS AND IMPORTS			
German Oceania	255,329	473,722	218,393 Inc.		\$281,679,422	\$475,171,773	\$193,492,351 Inc.
Philippines	7,675,646	24,931,280	17,255,634 Inc.				
TOTAL OCEANIA	\$ 23,550,612	\$ 54,216,691	\$ 30,666,079 Inc.				
AFRICA:							
British South	\$ 58,680	\$ 52,395	\$ 6,285 Dec.				
Egypt	2,415	659	1,756 Dec.				
British East	581	189	392 Dec.				
British West	37	37	Inc.				
Abyssinia	145	2,000	1,855 Inc.				
Portuguese	10,255	10,255	Inc.				
TOTAL AFRICA	\$ 72,076	\$ 55,280	\$ 16,796 Dec.				
GRAND TOTAL	\$137,652,380	\$206,064,365	\$ 68,411,983 Inc.				



Mr. A. W. Leonard, President of the Puget Sound Traction, Light and Power Company, who has been prominently identified with War Camp Service in the Northwest



Seattle's Showing in War Camp Service

That Seattle is one of the first communities in the country in war camp service is due to the understanding, sympathy and initiative of one man in particular—A. W. Leonard, president of the Puget Sound Traction, Light & Power Company. It is not that Mr. Leonard has brought this about unaided, for he has not. He has had the co-operation of the public spirited men of Seattle in bringing that city into prominence as a war camp community vitally interested in and committed to the promotion of the welfare of the men in service uniform, whether officers or privates. Mr. Leonard has been and is the most prominent figure and the leading spirit in this particular work. He is chairman of the committee that established the Soldiers & Sailors Club and is president of the Army & Navy Club.

The call came to Mr. Leonard from the head of the army and navy commission on training camp activities, as these commissions were called originally, now the commission on war camp community service, Mr. Raymond Fosdick, to become the active head of these organizations, since merged, for the Northwest.

Mr. Leonard's response was immediate, practical and pointed. It was the Soldiers & Sailors Club, a home for the man who up to that time had been homeless visitors in the city. The organization of the club awoke in Seattle a deep and permanent interest in the soldier and sailor boys, and insured them against either ill-treatment at the hands of the thoughtless or greedy, or indifference on the part of the general public.

A large building, erected originally for the Seattle Athletic Club and appointed for the sole and only purpose of housing that organization, was unoccupied at the time Mr. Leonard was appointed. His first act was to secure these quarters, which means that he promptly made a lease of the building for the period of the war, advanced the first quarter's rent and then organized the Soldiers & Sailors Club. He was promptly and heartily seconded in his efforts by such men as C. E. Peabody, J. W. Maxwell, C. Allen Dale, Nathan Eckstein, Raymond Frazier, O. D. Fisher, Sol Friedenthal, Geo. F. Russell, Josiah Collins and many others, with the result that the club was an estab-

lished institution within two or three weeks from the time it was first conceived, not only under operation, but financed and in popular good will.

It is quartered in a seven-story building, with a lobby, reading, lounging, writing, smoking, billiard and bed rooms, a dining room, a Turkish bath, a swimming tank, shower baths and a ballroom. It has accommodations for 350 men in sleeping quarters, but has been so popular that it became necessary to take over the old courthouse as an annex and put in 500 additional beds. The quarters are fine, clean, well-ventilated, splendidly furnished and attractive. The club is very popular and is known and famed among men in both branches of the military service over the entire country, for go where you will the men encountered have heard about the Soldiers & Sailors Club of Seattle.

Having disposed of the men in the ranks in this manner, the question then arose: What about the officers? The answer to this was the Army & Navy Club, also organized by Mr. Leonard, who is its president. Interested with him as aids in the second enterprise are practically the same men who helped him establish the Soldiers & Sailors Club.

The Army & Navy Club has the finest appointed club rooms in Seattle. Like the other club it is supported by civilians, and neither soldier, sailor or officer pays any dues in his own club. It is in each case his home. To be sure, civilian Seattle reserves the privilege of meeting the nation's defenders in these places. It is there they find their social diversions and get acquainted with Seattle people. The men in uniform, one and all, are delighted with the arrangement, and so are the people of Seattle, who are supporting the institutions unreservedly and most generously. No appeal made in the name of either club goes unheeded; public response, on the contrary, is instant and enthusiastic.

ROBERT J. TOD COMPANY ACTIVITIES

The Robert J. Tod Company, which concern has been very much in evidence lately, owing to Mr. Tod's appointment as general manager of the Intercontinental Navigation Corporation, is again making strides in further

business connections. Mr. Todd now announces that his firm has been appointed New York agent for Messrs. Colin & Turner, who are bunkering agents of Philadelphia. Mr. Alfred Turner, the sole member of the firm of Colin & Turner, has been well known in shipping circles for the last forty years, having been for a number of years in the old, well-known firm of Peter Wright & Sons of Philadelphia, and for a number of years trading under his own name in the Byrne Building, Philadelphia.

The firm of Colin & Turner, during the early part of the war, held all the coal contracts for account of the British government at ports on the Atlantic seaboard and still hold a number of these. This firm has one of the best reputations in bunkering circles on the Atlantic seaboard, and Mr. Tod has been instrumental in concluding several large contracts with British and Norwegian ship-owners for their bunker coals to be supplied to steamers in New York, and it has therefore been found necessary for Messrs. Colin & Turner to establish an agency here.

The handling of all these shipments will be attended to by Mr. Lynch, who for a number of years has personally attended to any of Messrs. Colin & Turner's bunkering in New York.

Any steamship owners requiring bunkers, also economical, prompt and efficient handling of same in New York Harbor, will have the benefit of the allied experience of Messrs. Colin & Turner and the Robert J. Tod Company at their disposal.

This connection has further enlarged the offices of the Robert J. Tod Company, who are taking more space at No. 25 Beaver street.

SEAMAN INSURANCE

Practically 80,000 officers and sailors on American-owned and registered vessels trading in the waters where the German submarines operate have been insured by the Treasury Department. The aggregate of the policies total well over \$100,000,000.

This insurance is made compulsory by law, and since the submarine began to infest American waters it applies to all vessels trading to or from our Atlantic and Gulf ports. Small fishing vessels are excluded.

FIREMAN'S FUND

Insures Hulls, Cargoes,

HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

G. KIRKHAM SMITH, Special Agent
407 LEWIS BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

DEPARTMENT OF COMMERCE Washington

August 14, 1918.
Department of Commerce Endeavoring to Locate Harry M. Beachy

The Department of Commerce is endeavoring to locate Harry M. Beachy, an American seaman who has been awarded by the British Government a silver medal in recognition of the part which he had in saving the crew of the British schooner "Busy Bee." Mr. Beachy was born December 22, 1894, either at Baltimore or at Grantsville, Maryland.

Every effort to locate Beachy has been made but so far without success. The medal is now being held in the Department of Commerce in the hope that some trace of Beachy may be found.

HANDLING EQUIPMENT AT THE STANDIFER PLANT

The readers of this magazine are no doubt familiar with the different methods employed in handling material for steel ship construction. In the Northwest the best-known system is the overhead aerial tramway, while in the Southland the locomotive crane as well as the aerial has been thoroughly tried out.

There are shown herewith photographs of the "A" frame type of wooden traveling tower derrick which

has been installed in the G. M. Standifer Construction Corporation's plant at Vancouver, Wash., this being a six-way steel yard. These machines went into operation about the first of August when the first keels were laid on the ways.

These derricks are self-propelling, being equipped with 9 by 10-inch steam engines. The total height from ground to boom is 45 feet; the length of boom 80 feet; capacity ranging from 10 tons at 40 feet radius to 5 tons at 70 feet radius.

With a derrick of this kind it will be found possible to serve two ships and also, instead of bringing the material to the derrick itself for placing, the track is so arranged that the derrick can propel itself to the steel plate shop, taking the material from that point and handling it by its own motive power direct to the point of placing. At the present time there are six ways in the Standifer yard, the four derricks being placed between the ways. The final arrangement will be completed by the placing of an additional derrick on the outside of the two end ships; thus making it possible for two derricks to serve one ship while the greater part of the material is being placed, and when the construction is well under way so that the material does not have to be placed in large quantities the other derrick can be released

for the ship on the next ways.

Tests of these derricks on the steel construction work already completed at this yard have demonstrated the capability of the derricks and the management of the plant have been thoroughly satisfied with the service record of these devices.

Derricks of this type can be seen in operation in almost any wooden shipyard in the Puget Sound district, but we believe that this is the first installation of this character in a steel shipyard. One of the great advantages is found in the shortness of the time required for the installation of one of these machines. In one instance where another type of derrick was to be replaced, the Pacific Derrick and Hoist Company completed the work twenty-one days after receiving the order.

REVIEWS

Ross Products. The Ross Heater and Manufacturing Company, with offices in the Mutual Life Building, Buffalo, New York, has issued some interesting pamphlets dealing with the Ross crosshead-guided expansion joint, surface condensers and multi-head water heaters. This apparatus is of a highly interesting nature and should interest marine engineers who will be mailed copies on application to the Ross Heater and Manufacturing Company.



A group of "A" frame derricks in the shipyard of the G. M. Standifer Construction Corporation

INSURANCE COMPANY

Freights and Disbursements

STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Special Agent
220 BYRNE BUILDING
LOS ANGELES, CAL.

O. G. ORR & CO., Managers
ATLANTIC MARINE DEPARTMENT
37-43 WALL STREET NEW YORK

AND BRITISH COLUMBIA, 264 COLMAN BUILDING. SEATTLE, WASHINGTON

Manual for Local Defense, by Henry A. Bellows, Major, 13th Battalion, Minnesota Home Guards. The Macmillan Company, 66 Fifth Avenue, New York. \$1.00 net.

This book aims to make clear the principles underlying the organization and tactical work of all types of local defense units, and to suggest a specific program by which these principles can be applied. The problems of local defense, organization, equipment, tactics and drill are taken up in successive chapters. The illustrations include photographs as well as diagrams in the text.

Handbook of Practical Shipbuilding, by J. D. MacBride, Superintendent of Yard No. 1, Hog Island Shipyard. D. Van Nostrand, 25 Park Place, New York. 200 pages, 100 illustrations. \$2.00 net.

This work deals with present-day shipyard practice as applied to the standard carriers which are being built in such great quantities for the government. The book is intended primarily for the man on the job who wants to know "What he has to do, why he has to do it and how he should do it." The work, which is divided into three main sections, follows actual working conditions throughout. The division of contents is arranged as follows: Hull construction, including shipyard tools, shipways, keels, shell plating, frames, etc.; engine installation, including boilers, machinery, piping, etc., and hull engineering, including steering gear, deck machinery, ventilation, etc. The book has been gotten out in convenient size and should appeal strongly to the men who have just taken up shipbuilding as a profession as the descriptions of the work are couched in language that the beginner will readily understand.

LAUNCHINGS FROM JULY 20th TO AUGUST 20th, INCLUSIVE

July 21st—Kenosha, 3500 tons dw., Ferris type. From Sanderson and Porter, Raymond, Wash.

July 23rd—Braeburn, 4000 tons dw. From Peninsula Shipbuilding Company, Portland, Ore.

July 23rd—Western Comet, 8800 tons dw. From Northwest Steel Co., Portland, Ore.

July 24th—General Baratier, 3000 tons dw. From Foundation Company, Portland, Ore.

July 25th—Gaffney, 7500 tons dw.

From Skinner & Eddy Corp., Seattle, Wash.

July 24th—Toul, 3000-ton auxiliary vessel. From Foundation Company, Tacoma, Wash.

July 25th—Fassett, 3500 tons dw., Ferris type. From Tacoma Shipbuilding Company, Tacoma, Wash.

July 26th—Brisk, 3500-ton auxiliary schooner. From National Shipbuilding Company, Seattle, Wash.

July 26th—One cannery tender. From the Sehrrs Shipyard, Port Townsend, Wash.

July 26th—One barge. From the Sehrrs Shipyard, Port Townsend, Wash.

July 27th—West Hobomac, 8800

tons dw. From Skinner & Eddy Corp., Seattle.

July 27th—Barringa, 4200 tons dw. From Patterson MacDonald Shipbuilding Company, Seattle, Wash.

July 27th—L. J. Drake, 10,000-ton dw. tanker. From Ames Shipbuilding and Dry Dock Company, Seattle, Wash.

July 27th—War Stikine, 2800 tons dw. From Cameron-Genoa Mills Shipbuilders, Ltd., Victoria, B. C.

July 29th—Western Hope, 8800 tons dw. From J. F. Duthie & Co., Seattle, Wash.

July 29th—Kangi, 3500 tons dw., Ferris type. From G. M. Standifer Construction Corporation, North Portland, Ore.



One of the derricks at work on the newly constructed building ways

ILLINOIS



The advertisement features a central diamond-shaped frame containing three detailed illustrations of Illinois Tool Works products: a large industrial gear, a smaller gear, and a long, cylindrical tool. The frame is set against a background of two industrial scenes. The left scene shows a large ship being constructed in a shipyard, with a crane lifting a large section. The right scene shows a large industrial machine, possibly a mill or lathe, with sparks flying from its cutting point. The word "TOOLS" is written in large, bold, sans-serif capital letters across the top of the diamond frame. Below the frame, the text "The constant stress of high speed production in war industries" is on the left and "has strongly emphasized the thorough merit of 'Illinois' Tools." is on the right.

TOOLS

The constant stress of high speed production in war industries

has strongly emphasized the thorough merit of "Illinois" Tools.

ILLINOIS TOOL WORKS
CHICAGO, U. S. A.

Represented by LEWIS G. HENNES, Monadnock Building, San Francisco, and Title Insurance Building, Los Angeles

July 30th—Tillamook, 3500 tons dw., Ferris type. From Grant Smith-Porter Ship Company, Portland, Ore.

August 1st—Cabura, 3500 tons dw., Ferris type. From Coast Shipbuilding Company, Portland, Ore.

August 1st—Ashburn, 4500 tons dw., Ballin type. From Supple-Ballin Shipbuilding Company, Portland, Ore.

August 4th—Invincible, 12,000 tons dw. From Bethlehem Shipbuilding Corp., Alameda, Cal.

August 4th—Aiken, 3500 tons dw., Ferris type. From Grant, Smith, Porter Ship Company, Portland, Ore.

August 6th—Gardner Williams, topsail schooner. From Columbia En-

gineering Works, Portland, Ore.

August 7th—Nupolela, 3500 tons dw., Ferris type. From Grant, Smith, Porter Ship Company, Portland, Ore.

August 10th—Western Plains, 8800 tons dw. From Columbia River Shipbuilding Corporation, Portland, Ore.

August 12—Wakanna, 3500 tons dw., Ferris type. From Seaborn Shipyards Corporation, Tacoma, Wash.

August 12th—Westport, 8800 tons dw. From Ames Shipbuilding and Dry Dock Company, Seattle, Wash.

August 15th—West Hosokie, 8800 tons dw. From Skinner & Eddy Corp., Seattle, Wash.

August 17th—Zirkel, 9400 tons dw.

From Moore Shipbuilding Company, Alameda, Cal.

August 17th—Bobring, 3500 tons dw., Ferris type. From American Fisheries Company, Bellingham, Wash.

August 19th—Latoka, 3500 tons dw., Ferris type. From Grant Smith-Porter Ship Company, Portland, Ore.

August 19th—War Chief, 8800 tons dw. From J. Coughlan and Sons., Vancouver, B. C.

August 20th—War Tanoo, 2800 tons dw. From Western Canada Shipyards, Ltd., Vancouver, Wash.

August 20th—Braxton, 4000 tons dw. From Peninsula Shipbuilding Company, Portland, Ore.

The Work of Seattle's Great Forge Plant

THE Pacific Construction and Engineering Company's big Seattle plant has now increased its equipment and efficiency to the point where it is able to turn out from sixteen to eighteen ship's shafts per day. All of these shafts are for the new vessels of the Emergency Fleet Corporation and includes shafting, rudder stocks, rudder posts and arms, stern frames and engine forgings for some two hundred of the Government's new cargo carriers.

While this plant was only established last year it is now operating full blast twenty-four hours a day turning out orders for the Federal Government and for every shipyard on the Coast from Vancouver on the North to Long Beach on the South.

The main building was recently extended to a length of 700 feet and ten more furnaces will be installed, giving a total of twenty. Work is also under way on two additional overhead cranes, which will make six cranes in the main building. A third spur track is being built into the works, which will furnish exceptional trackage facilities, giving a spur on either side of the works and one in the center. Mr. R. C. Montague, founder and president of the works, recently placed orders for five heavy rough-turning lathes and additional equipment to accompany them. When these improvements are completed, the company will have three quick-acting, steam hydraulic presses in a few weeks, the third

machine having been ordered, eight large, heavy hogging lathes, six traveling cranes in the main shop and four in the wings, twenty heating furnaces and two annealing furnaces with all the equipment that goes with them.

At the present time the plant is using one thousand tons of steel a

month in forging ingots and has guarantees of two thousand tons of ingots per month in the future. Recently the Pacific Engineering and Construction Company was asked to figure on forgings for large plate bending rolls for the new Alameda plant of the Bethlehem Shipbuilding Corporation, and guaranteed deliv-



Unloading a fifty-one ton ingot at the plant of the Pacific Construction and Engineering Company

month in forging ingots and has guarantees of two thousand tons of ingots per month in the future.

Recently the Pacific Engineering and Construction Company was asked to figure on forgings for large plate bending rolls for the new Alameda plant of the Bethlehem Shipbuilding Corporation, and guaranteed deliv-

ery in three months against the guarantees of eighteen months made by heavy forging plants in the East. The concern has accepted orders for heavy roll forgings and is making good on its delivery guarantees to the Seattle North-Pacific Shipbuilding Company of Seattle, the Todd Dry Dock and Construction Com-

pany of Tacoma, the Standifer Construction Corporation of Vancouver, Wash., the Moore Shipbuilding Company of Oakland and several other large Coast shipyards.

The Pacific Construction and Engineering Company stands as one of the pace makers of the country in heavy forge work as a result of the splendid efficiency obtained through the untiring efforts of President Montague, James Bingham, general superintendent of the forge shops, and Harry Smith, assistant superintendent. Every machine in the plant is kept turned up to produce the maximum output and the force of some two hundred men are working heart and soul with the management to keep the plant in the blue ribbon class. Hard efforts and consistent team work by all concerned has built up an organization which the Northwest justly feels proud of and the plant is serving the country well not only in the matter of turning out high-class heavy forgings at a remarkable rate, but also in subscribing for Liberty Loan securities and other ways. On the last Liberty Loan the employees of this plant won the pennant for per capita subscriptions in plants of its class.



Fifty-one ton ingot being forged into roll by one of the big forging presses



General view of the launch used for experimental purposes with a reversing rudder



Three exposures on the same plate showing the rapidity and shortness of possible turning



Rudder in normal position for ordinary cruising



The double steering wheel for handling rudders



Rudders in position for quick turning



Position of the rudders for backing the boat with the engine still going ahead



Birdseye view showing the two quadrant wheels for handling the rudders. These lock and work together or separately as desired

Reversing Rudders for Boats

THE General Electric Company has recently equipped a 25-foot motor boat, owned by Mr. W. B. Landreth, deputy state engineer of New York, with a reversing and control rudder, with a view to showing the possibility of eliminating reversing turbines from turbine propelled ships.

This boat is capable of backing up with the engine running in a forward direction, but the most valuable feature is its ability to turn around in its own length. With this rudder the boat can be maneuvered without steerageway—that is, with the rudders placed at right angle to the axis of the keel and with engine running at full speed, the boat will stand perfectly still and then, by making a slight adjustment of the rudders, the boat will turn around in its own length and continue to do so until the adjustment is changed and during the process of this circular motion it can leave for any point of the compass at full speed.

As an illustration of the maneuvering qualities of the rudder, this boat was run into a 40-foot slip full speed ahead, turned around and came out bow first without touching either side of the slip.

The rudder on the Landreth boat, the invention of H. O. Westendart of Boston, consists of two steel plates, 3/16 of an inch thick, each plate the same size as the normal rudder on this type of boat. The rudder post consists of a steel rod inside a steel tube, one plate of the rudder is attached to the tube and the other to the rod. The boat is equipped with two steering wheels, arranged side by side, one wheel to operate the rudder affixed to the tube, and the other the rudder fastened to the rod. The manner in which the rudders are affixed to the stern of the boat is best shown in Fig. 1. This shows the two rudders close together in the position for normal cruising when they are used the same as an ordinary rudder.

The two steering wheels are on the same axis and when locked together operate as one wheel for ordinary cruising (see Fig. No. 2). But when the boat is to be turned sharply or reversed, the wheels are instantly released so that they may be revolved in opposite directions to manipulate the rudder plates.

It is truly remarkable how easily the boat can be made to turn within its own length. By placing the rudders in the position indicated in Fig. No. 3, the boat will turn around in a few seconds and travel back up its own make. How easily this maneuver is executed is proven by the remarkable photograph reproduced in Fig. No. 4. This picture shows three exposures on one plate, depicting the Landreth motorboat turning in approximately its own length while travelling full speed. The exposures were made a few seconds apart and the boat made a complete turn in approximately twenty seconds.

With a few turns of the wheels the rudder plates are set in V-shape, as illustrated in Fig. No. 5, and with the propeller running full speed ahead the boat almost instantly stops and starts to run backwards. The boat was brought from full speed forward

to backing in nine seconds. With the reversing gear originally installed on this boat it took twenty-six seconds to back. The reversing speed can be controlled to any degree by increasing or decreasing the angular positions of the rudders. The reversing motion is imparted by a stream of water thrown back against the rudder by the propeller and projected thereby forward along the sides of the boat toward the bow. The speed of this water is sufficient to propel the boat backwards at about 30 per cent of the full speed ahead. It will be noted that there is a steel plate, or fin, above the rudder which prevents the water thrown back by the propeller to escape over the top of the rudder. This fin assists in directing the water forward along the sides of the boat.

The manner in which this experimental boat was equipped with the new rudder is shown in Figs. Nos. 6 and 7. It was discovered in these experiments that the angle of the supporting rod must be 90 degrees, or more, with the propeller shaft.

MATTRESS CONCERN EXPANDS

The story of the expansion of the Washington Mattress Company, Seattle manufacturers of berthing equipment, is a story that is in close harmony with and typical of the expansion of the Queen City.

This company was established in 1908, in which year they began operations in a small one-story frame building, 60x100 feet. Three years later the business had so increased that they moved to a new location at Western avenue and Pike street, occupying a five-story brick building. In the fall of 1916 the Washington Mattress Company commenced construction of a modern reinforced concrete building in the Seattle tide-lands, 80x200 feet, three stories and basement. Electrical operation which

included separate motors for each machine was installed. Beginning with the outfitting of ships in a small way in 1908 a specialty was made of overhauling and fitting out of vessels operating on Puget Sound; since that time they have completely supplied nearly every large steamship, newly constructed or rebuilt, in the Northwest district.

When Seattle undertook the wholesale construction of steel ships the company entered this field and today lays claim to a record of completely outfitting with their equipment every steel ship from Seattle's yards. In June of 1915 the furnishing of the S. S. "Nanking," formerly the S. S. "Congress," was completed by the Washington Mattress Company. All mattresses, pillows, steel berths and cushions throughout this beautiful steamship were furnished by this concern.

The Washington Mattress Company, which is under the management of F. C. Lamb, maintains an enviable reputation for delivery promptness and take justifiable pride in the fact that their splendidly complete organization can assume the shipbuilders' burden in so far as berthing equipment is concerned.

INDEPENDENT PNEUMATIC TOOL COMPANY HAS NEW GENERAL OFFICE

The Independent Pneumatic Tool Company have leased the entire sixth floor in the Otis Building at 600-W Jackson Boulevard, Chicago, Ill. This space contains 12,000 square feet and will be occupied by the lessee Company for their General Offices.

Mr. John D. Hurley, President of the Company stated that the great demand for Pneumatic Tools for Government work and Shipbuilding had forced his Company to seek larger quarters. The space now occupied at 1307 S. Michigan Avenue contains 6,000 square feet while the new quarters provide just double this area. Removal into the new quarters will be effected about September 1st.



Plant of the Washington Mattress Company at Seattle



General view of the Best Steel Casting Company's plant at East Oakland, California

The Best Steel Casting Company

SERVING the customer pleasantly and well and backed up with a thorough knowledge of the business at hand with a strong determination to succeed, are the important factors which make for the success of the business enterprise of today. A noteworthy example of these fundamental business principles at work is seen in the organization of the Best Steel Casting Company.

From a very small beginning the Best Steel Casting Company has developed during the past five years into one of the large steel-making concerns of the Pacific Coast, employing over two hundred men and operating a steel plant located in East Oakland which covers six acres. This industrial plant is admirably situated on the main line of the Southern Pacific Railroad with spur track connections with the Western Pacific road.

The building construction of this plant has been a program of repeated expansions, the most recent structure

being a new unit of sixty by two hundred and fifty feet. Two units seven hundred and forty feet in length are now occupied by the moulding and finishing departments. These modern buildings are designed so as to utilize the maximum daylight and fresh air, which factors are of great importance in securing the full efficiency of the workers. Other buildings house the flask and pattern shop and two pattern storages.

"Best" steel castings are manufactured by the converter process and a survey of the equipment and tools of the Best plant show a wise and modern selection of labor-saving machinery. Two steel converters of two ton capacity each with two sixty-inch cupolas are used at the present time. Plans are being completed to increase the monthly capacity of four hundred and fifty tons to twice this amount. The moulding and finishing departments are now served by four ten-ton and one five-ton traveling cranes. Six large steel ladles are used in pouring the moulds. Other equip-

ment includes four tumbling barrels, two sand blast machines, four drying ovens and an annealing furnace for heat treating purposes.

The finishing department is equipped with twelve swing grinding wheels and four stationary grinders. Thor air chippers are served by three Ingersoll Rand compressors.

The executive personnel of the Best Steel Casting Company is composed of well-known steel men of the Pacific Coast. H. H. Whiting, the vice-president and general manager, was formerly treasurer of the Columbia Steel Company. Superintendent John Twohy, who was also connected with the Columbia Steel Company, is widely known on this Coast as an authority on the subject of steel making. The company's sales department is directed by George Gunn, who for several years was in charge of steel castings at the Union Iron Works.

Until April, 1917, the Best Steel Casting Company was a subsidiary of the C. L. Best Gas Traction Company, at which time the C. L. Best Company relinquished all connections with the steel plant and complete control is now vested with the present management. Since this reorganization has taken place the Best Steel Casting Company has enjoyed a remarkable expansion and increased business, which places this concern among the leading industrial organizations of the West.



One of the main foundry bays at the Best Steel Casting Company's plant

NEW INSTRUMENT AND RELAY CATALOGUE

Among the new types of apparatus listed for the first time in the revised edition of Westinghouse Catalogue 3-B are the types AW and FW duplex instruments, which consist of any two of the standard types AW or FW instruments, respectively, contained in attractive dull black metal cases; the types EH and PH ammeters, which are hot-wire instruments suitable for operation on either direct-current or alternating-current circuits of any frequency; the type OA watt-hour meters for switchboard service, which are similar to the well-known standard house-service type OA watt-hour meters, except that they are designed for switchboard service;

the motor-operated type M graphic instruments; type CV voltage relays, which can be furnished to operate either on under-voltage or over-voltage, as ordered; the type CP reverse-phase relays to provide against phase reversals; type BT transfer relays, which operate with the excess current relays, such as the Westinghouse type CO and type CR, to directly energize the operating coil of the circuit-breaker from the current transformer, no separate operating circuit being required, and type CT temperature relays, which depend for their operation upon the temperature of the apparatus on the circuit as well as the amount of the overload.

This catalogue, issued by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., listing instruments and relay in standard 8½ x 11 size, is a departure from the original edition of the same catalogue, in that wherever possible each particular type of apparatus is listed on only one page, and where more than one page is required, the several pages necessary are confined to a description and listing of only the one particular type, so that it is very easy to find what you are looking for in this catalogue.



The finishing department in the big foundry building

Making Americans on the Railroad

By Samuel Rea

President, Pennsylvania Railroad Systems

This statement was furnished by Mr. Rea to Hon. Franklin K. Lane, Secretary of the Interior, following the Americanization Conference, called by Mr. Lane, and held at Washington. It tells some of the methods adopted, and results achieved, in persuading and fitting foreign-born employees of the Pennsylvania Railroad to become loyal and useful citizens of the United States.

AS one of the largest employers of labor in the United States, the Management of the Pennsylvania Railroad System has naturally felt keenly the importance of adopting practical means for encouraging the Americanization of as

many as possible of its foreign-born employees. This subject has, in fact, for a long period occupied a most important place in the labor policies of the System.

The task of producing good United States citizens from the millions of men and women of alien birth who are in this country, and who in normal times come here by the hundreds of thousands yearly, appears to resolve itself into two problems:

First, America must be made to seem to these people a good place, not merely to make money in, but to live in.

Second, they must be induced to give up the languages, customs, and methods of life which they have

brought with them across the ocean, and adopt instead the language, habits and customs of this country, and the general standards and ways of American living.

Had the solution of these problems of assimilation been successfully achieved along broad lines in the past, possibly there would not, for so long a period, have been witnessed the familiar phenomenon of large numbers of foreigners coming to this country, working a few years and then returning with their savings to live in their native lands. Nor would there today be foreign colonies in all large American cities, and distinctively foreign areas of agricultural settlement in other portions of the country. In sort, the dream of the "melting pot" would be realized in the America of today.

How far that dream actually is from realization is only too clearly attested by the unfortunate fact that in many of the typical foreign colonies of American cities—such as Italian, Greek, etc.—even the second and third generations still remain distinctively Italian or Greek, speak the languages of those races more readily than English, and substantially are foreigners, though born and living in America.

Practical Ends in View

The Management of the Pennsylvania Railroad System has consistently endeavored to solve the problem of Americanizing its foreign-born workers along purely practical lines, having in mind the two chief points of successful assimilation mentioned. In addition to the important patriotic considerations involved, which alone would unquestionably more than justify all the efforts made in this direction, the Pennsylvania Management believes that it is in the highest sense good business to persuade and assist



A sample showing the wide range of steel castings that a large Western steel foundry is called upon to produce



This Portable Scarphing Machine was developed and has been in successful daily operation in our own yards for eighteen months. It has been adopted by a number of progressive shipyards in this country and England to speed up shipbuilding.

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*Another
Consistent
Record*

Launching of the S. S. "West Hobomac". This celebrates the first anniversary of the Emergency Fleet Corporation and is the twentieth vessel we have launched for their account since their organization. We have also delivered them twenty complete vessels, one of which was launched on June 30th and commandeered at the fitting-out berth, making 176,400 dead-weight tons delivered them in this period.

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Evening classes for non-English speaking employees form an important part of the Americanization scheme

foreign-born employees to become citizens of the United States.

The task has proved to be one of very considerable magnitude, as may be judged from the fact that there are at present, on the whole System, both East and West of Pittsburgh, over 33,000 men of foreign birth.

Before the war this number was greater by some thousands. It has been very materially reduced, of course, by the large number of un-naturalized foreigners—principally citizens or subjects of the Allied Governments—who have in the last three years returned to their homes to take part in the defense of their respective countries.

This drain on the supply of foreign-born laborers has, in fact, been one of the most serious difficulties encountered in maintaining a sufficient working force under war conditions.

Distribution of Aliens

On the Pennsylvania Lines East of Pittsburgh, at the present time, about 16 per cent of the total employees are of foreign birth. On the Lines West of that city, operating chiefly in Ohio, Indiana and Illinois, the proportion is somewhat smaller, but it is still quite material. Of the more than 33,000 foreign-born men working on the entire System, about 25,700 are employed east of Pittsburgh, and 7,500 west of that point.

Some years ago, prior to the commencement of the great conflict in which the United States is now one of the leading participants, a canvass was made of the alien employees on all portions of the Pennsylvania Systems. This investigation showed that Italians greatly predominated in numbers. Today they make up nearly one-third of all employees of foreign birth east of Pittsburgh. It was found, also, that large numbers of the Italians, while they could not properly be termed illiterate, since they could read and write their own language, were nevertheless unable to understand English at all, either in written or spoken form.

With the feeling, for these reasons, that Americanization work was more urgently needed among the Italians on the Pennsylvania Railroad than among the representatives

of any other nationality, a correspondence course in Italian-English was inaugurated on the Lines East of Pittsburgh.

Teaching Italians English

This work was placed in direct charge of a native-born Italian, who is also a graduate of Yale, and is an enthusiast on the subject of Americanization. A similar course in Italian-English has also been established, under the charge of a native-born Italian, on the Lines West of Pittsburgh.

The original purpose in establishing these courses was to make Italians, who are largely employed in track maintenance gangs, more efficient workmen by teaching them the English language so that they might better understand the orders of their Foreman. The language courses are also utilized to instruct the men in proper use of their tools, and in the fundamentals of safety, health and sanitation to aid them in raising their standards of living.

Methods of Instruction

For this reason all of the language lessons, beyond the most elementary, deal with practical subjects. As the

course advances the work consists largely in rendering from Italian into English brief instructions relative to the use of tools and implements, and information regarding the proper method of laying and repairing track and the fundamental safety rules. One entire pamphlet is devoted to the use of signals and signal rules, and two others to the use of track tools.

Altogether there are eleven pamphlets in the Italian-English course, and the last one of the series is devoted to the subject of Naturalization.

4307 Italian Students

On February 20, 1918, there were 4,307 students enrolled in the Italian-English course on the Lines East of Pittsburgh alone, or more than one-half of all the employees of Italian birth working on that portion of the Pennsylvania System.

Experience on the Pennsylvania Railroad has shown that the best results in endeavoring to teach foreign-born employees the use of the English language are attained by measures which will practically compel them, in the course of their everyday work, to accustom themselves to speaking and thinking in the new tongue. For this reason, information especially intended for employees of alien birth is usually printed in English instead of in their own language. Practically every gang of workmen has at least one man besides the Foreman who can read English. Printed information in English is deciphered by him and explained to the others, so that the double purpose is served of imparting useful information and at the same time giving a language lesson.

In a similar way, lectures on safety and similar subjects, while necessarily given at times in Italian and other foreign languages, are always accompanied by lantern slides and other illustrations in which English words are used.

Employment of Mexicans

After the first few months of the War, as is well known, the labor situation in this country became very acute, and it was necessary for the Pennsylvania Railroad to find and open up new and hitherto untouched sources of labor supply. After care-



One of the speakers addressing a noon-day gathering of Mexicans, who are gradually being made good American citizens

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ful investigation a considerable number of Mexicans were induced to enter the service. They have been chiefly located along the Main Line between Pittsburgh, Philadelphia and New York. While they have been found efficient and satisfactory workmen in the whole, they, like the Italians, were greatly handicapped by the fact that few could speak any language except their native tongue, which is Spanish.

To meet this condition, therefore, a special course in Spanish-English was prepared for the Mexicans, similar to the Italian English course. On February 28, 1918, there were 451 Spanish-speaking employes learning English in this way.

The Mexican laborers have been chiefly concentrated in camps located at various points along the lines. All modern features to promote sanitation and health are adopted. In addition, provisions have been made for amusements and recreation, including camp recreation rooms, victrolas, etc. Instructive entertainments are given from time to time under the auspices of the Young Men's Christian Association. Whenever possible religious services for the Mexican employes are conducted

under the direction of a Catholic church.

In addition to the language courses carried on through the educational organization of the Pennsylvania Railroad, instruction is also provided, by correspondence, in electricity (including elementary mathematics) and in stenography. Altogether, out of approximately 166,000 employes on the Lines East of Pittsburgh, 18,769, or 10.7 per cent of the total, were on February 28, 1918, enrolled in the educational courses.

While a large proportion of these students, outside of the language courses, are naturally men and women of American birth, a considerable number of foreigners are also included in the other courses, especially such men as have mastered the language work and so fitted themselves for advancement to Foreman, and are now preparing for further progress by educating themselves in some of the more technical matters relating to railroad operation.

"The Americanization of Tony"

Supplementing the correspondence courses, numerous safety lectures are conducted solely for the benefit of alien employes.

To sustain interest in these efforts, and to combine entertainment with educational features, considerable time and money were spent in the preparation of a moving picture film, entitled "The Americanization of Tony."

This film depicts the career of a young Italian who comes to this country, goes to work on a railroad, develops habits of carelessness in spite of many warnings, and finally is seriously injured. He then takes his lesson to heart, develops into a model employe, becomes interested in Americanization, and finally is naturalized as a good citizen of the United States. This film has been exhibited thus far to gatherings of foreign-born employes at eighty of the principal points along the Pennsylvania Railroad System, and has carried its message to thousands of individuals.

While special efforts have been devoted to the Italians, on account of their great numbers, Americanization work has also been directed among the employes of the other foreign nationalities represented in the working forces of the Pennsylvania Railroad. Broad opportunities along these lines have been, of



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course, presented in connection with the Liberty Loans.

During the offering of the first and second Liberty Loans, systematized campaigns were carried on among the alien workers with substantial and gratifying results. Some of the figures applying to the First Loan will be sufficient to indicate the extent to which participation of the foreign-born employees was secured.

At the time when the First Liberty Loan was offered to the public, the Pennsylvania Lines East of Pittsburgh and Erie had a total of 25,827 employees who had been born in foreign countries. Of this number, 8,140 employees, or almost 32 per cent of the total foreign-born, purchased Liberty Bonds, and this was within 2 per cent of the proportion of employees of American birth who subscribed.

The inquiry also brought out the interesting fact that there were in the service of the Pennsylvania Railroad, men of 42 different nationalities, besides native-born Americans, and that members of 30 alien races were included among the buyers of Liberty Bonds of the First Loan.

The good showing made by employees of alien birth in Liberty Loan subscriptions may doubtless be confidently accepted as evidence of true love for America, no less than as a high degree of thrift on the part of the foreign born. The latter characteristic, moreover, is further emphasized by the figures for the Pennsylvania Railroad Employees' Saving Fund. This fund at the present time has about 9,700 depositors, and of

this number approximately one-third are employees of foreign birth.

As early as 1904, the Pennsylvania Railroad, with the idea of encouraging thrift among its foreign-born employees, opened a campaign to increase its Saving Fund depositors, and as a result a great many Italian and Irish employees opened accounts in the Company's Saving Fund, and large numbers of them are depositors today. To assist in this work a special pamphlet of information was issued in both English and Italian.

To ascertain the proportion of foreign-born employees who had been naturalized, or were in process of becoming citizens, a special analysis was made as of June 30th, last. At that time, there were in the service of the Pennsylvania Lines East of Pittsburgh, 25,721 men of alien birth. Of this number it was found that 8,003 had been fully naturalized, 3,069 had taken out their first papers and 5,064 had definitely announced their intention of applying for naturalization. In other words, nearly 63 per cent of the total had either become United States citizens or had declared their intention of so doing.

On the Lines West, out of a total number of 7,500 employees of alien birth, about 1,900 are naturalized, 1,700 have taken first steps toward naturalization and 1,300 have definitely announced their intention of applying for citizenship.

Altogether, experiences on the Pennsylvania Railroad System in the effort to interest foreign-born employees in American citizenship have

been encouraging. The United States must, necessarily, rely on people of foreign birth to keep up its labor supply, if the processes of further settling and developing the country are not to come to a standstill. It is, therefore, a clear duty to take care of the foreigners who come to these shores, to make life worth while for them here, and safeguard them from being spoiled and degraded.

A condition approaching the ideal will have been realized when "Little Italys" and other foreign colonies disappear from American cities and when the children of immigrants, instead of being known by the nationalities of their parents, will simply be American boys and girls.

SPECIALIST IN CHARGE OF THOR SALES IN SOUTH

F. H. Charbono, who has for many years been engaged in selling Pneumatic Tools to the Shipyards along the Eastern Coast, traveling out of the New York Office of the Independent Pneumatic Tool Company, has just been appointed Manager of the Southern District, with headquarters at 1721 Jefferson Bank Building, Birmingham, Alabama.

Mr. Charbono is a Specialist in Pneumatic Tools for Shipyard use and on account of the enormous increase in Shipbuilding in the South, was selected for this position.

George C. Wilson, the former Birmingham Manager, has resigned to look after his own interests in the North.

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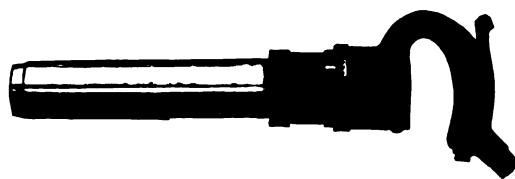
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Book Reviews

Strength of Ships, by J. Bertram Thomas, M. M. Inst. C. E. 300 pages, 114 diagrams, 31 tables. D. Van Nostrand Company, New York. \$3.00 net.

In writing this little work on the strength of ships, one of the chief difficulties was to decide what knowledge may be assumed on the part of the reader. Some years of experience in lecturing and private coaching of students of naval construction have led the author to conclude that no work of this nature would achieve its purpose if it were not complete in itself. To this end it has been necessary to draw largely on the standard works on Theory of Structures for the principles, formulae, and proofs which were essential to a clear understanding of the structural problems in a ship. The aim throughout has been to present everything in the simplest language, and to arrange each chapter so that the student may see the applicability of the theoretical matter to his own profession. It has been impossible to avoid altogether the use of the Calculus, but only a very elementary knowledge of that subject is required to follow the solutions with ease.

Modern Seamanship, by Austin M. Knight, Rear Admiral, United States Navy. 700 pages, 160 full-page plates. \$3.00 net. D. Van Nostrand Company, 25 Park Place, New York.

The seventh edition of this valuable work has been brought thoroughly up-to-date by the addition of much valuable matter, but in order to keep the volume down to a convenient bulk it has been printed on thinner paper with very happy results. The work includes chapters on the hull and fittings of a ship, rope knotting and splicing in manila, hemp and wire, mechanical appliances on shipboard, blocks and tackles, handling heavy weights, the compass, log, lead and submarine signalling, boats, handling boats in a surf, ground tackle, carrying out anchors, the steering of steamers, the rules of the road, maneuvering to avoid collision, piloting, handling a steamer alongside a dock, placing a ship in dry dock, weather and the laws of storms, handling steamers in heavy weather, the handling of torpedo vessels, keeping stations and maneuvering in squadron, towing, rescuing the crew of a wreck, man overboard, stranding and hints for junior officers doing line duty.

Werthington Pump and Machinery Corporation, 115 Broadway, New York, has issued Bulletin D-702, dealing with single and double acting vertical triplex power pumps. This bulletin contains a full description of the various types of power pumps turned out by the Deane Pump Works of Holyoke, Mass., and will be found of great interest both to the engineer and the prospective pump buyer.

Modern Navigation, by Frank Seymour Hastings. D. Appleton and Company, New York. 75 cents net.

This work was prepared with a desire to educate the navigators of the merchant marine in the Sumner and St. Hilaire methods employed in the Navy. At this time, when the merchant marine and our Navy are working so closely together and so many young men are seeking commissions

as deck officers, this little book should find a wide use.

CONTRACTS LET FOR THIRTY-THREE 3500-TON WOOD VESSELS

Contracts for the construction of thirty-three 3500-ton wood cargo vessels, seven wood barges and three wood harbor tugs were made week ending August 10, according to announcement made through Chairman Hurley's office of the United States Shipping Board Emergency Fleet Corporation.

The contracts were as follows:

Two wood cargo vessels, 3500 tonnage, Fulton Shipbuilding Company, Mormon Channel, Wilmington, Cal.

Two wood cargo vessels, 3500 tonnage, Seaborn Shipyard Company, Tacoma, Wash.

Two wood cargo vessels, 3500 tonnage, St. Helens Shipbuilding Company, St. Helens, Ore.

One wood cargo vessel, 3500 tonnage, George F. Rodgers & Company, Astoria, Ore.

Two wood cargo vessels, 3500 tonnage, Nilson & Kelez Shipbuilding Corporation, Seattle, Wash.

Five wooden barges, 2500 tonnage, Coastwise Shipbuilding Company, Baltimore, Md.

Six wooden cargo vessels, 3500 tonnage, Kruse & Banks Shipbuilding Company, North Bend, Ore.

Three wooden tugs (harbor), Leatham & Smith Towing & Wrecking Company, Sturgeon Bay, Wis.

Eighteen wooden cargo vessels, 3500 tonnage, Universal Shipbuilding Company, Houston Ship Canal, Harris Company, Texas.

Two wooden barges, 2500 tonnage. This contract supersedes and cancels former contract with Universal Shipbuilding Company.

CONLEY DISCOURAGES WORK IN SHIPYARDS ON SUNDAY

The observance of Sunday as a day of rest, rather than one of work, in the shipyards, is encouraged by Vice-President Howard Conley, United States Shipping Board Emergency Fleet Corporation, in a special order to District Executives, August 12.

The Vice-President says that work should not be done on Sunday except in cases of emergency or to complete special and necessary work, and the corporation therefore expects the Sabbath to be as free from work as circumstances will reasonably permit. For such work as is performed on Sunday, the rates of pay authorized in the decisions of the Shipbuilding Labor Adjustment Board are to prevail.

WIG TELLS CALIFORNIANS THAT CONCRETE SHIP HAS FUTURE

R. J. Wig, head of the Department of Concrete Ship Construction, attended a flag raising recently at the new concrete shipyard at San Diego, Cal. Mr. Wig made the chief address, during which he declared that San Diego was indeed fortunate in obtaining a yard and predicted that concrete ships may have important bearing not only on the outcome of the war, but on the future of humanity. He compared the concrete ship with the steel ship by likening a concrete building to a steel building.

COMPETITION OFFERS GREAT OPPORTUNITY TO SHIPYARDS

If all shipyard managers were able to know the facts which lead this committee to award championship pennants to the yards which have won them thus far, there could be no difference of opinion. Our only problem was to decide among the few plants, which, it might be said, were really in the race for production honors. There can be no doubt that the West Coast yards thus far are leading all competitors.

The Skinner & Eddy Corporation and the Union Plant of the Bethlehem Shipbuilding Corporation are doing magnificent work. Then, too, the Moore Shipbuilding Company, the Northwest Steel Company, the Columbia River Shipbuilding Company, the American Yards on the Great Lakes, the Newport News Shipbuilding & Dry Dock Company, the Great Lakes Engineering Works and the Manitowac Shipbuilding Company are steel plants that are making the leaders set a swift pace to retain their honors.

For the wood yards, the two plants of the Grant Smith-Porter Company, the Seattle Shipyards, the Allen Shipbuilding Company, the Peninsula Shipbuilding Company and the Supple-Ballin Company on the West Coast, and the Foundation Company and Traylor Shipbuilding Corporation in the East, are coming up fast and pressing the leaders.

I think that this competition gives the shipbuilders of America a great opportunity. It is the hope of our committee that the succeeding months will see more and more enthusiasm and closer results. The more difficult it may be for us to decide the winner, the more successful we feel this competition will be. We are all working for the same purpose—to quicken our construction program and speed the ships to France.—Rear Admiral F. F. Fletcher, U. S. N.

REQUIRES WOOD HULLS NEAR COMPLETION AT THEIR LAUNCHING

R. H. Beattle, Assistant Manager Division Wood Ship Construction, has notified District Managers and Supervisors that hereafter, in order to avoid unnecessary risks, each hull, before launching, must be at least 75 per cent complete. It is recommended that they be at least 85 per cent complete before launching. Detailed requirements are as follows:

All outside caulking completed up to bulwark rail and up to planksheer at forecastle, bridge and poop.

All upper deck to be fastened and caulked.

All of bulwark rail in place and fastened.

All athwartship bulkheads below upper deck in place and fastened.

All pointers and riders in place and fastened.

All fastening in hull proper entirely completed, including fastenings in outside planking; side, bilge and bottom ceiling; shelf and clamp timbers; hold beams, etc.

All hold stanchions in place and fastened.

Shaft tunnel in place and fastened except decking on top.



Getting one of the Puget Sound Bridge and Dredging Company's four-masted schooners ready for sea

Something New in Ships' Rigging

WHOEVER heard of rigging a ship on dry land? Well, it is being done right now and has been going on for more than two years. If you will go down in the basement of the Central Building, which is four or five blocks away from the waterfront, in Seattle, you can smell the real smell of tar, and rope, and spun yard, and hear the vernacular of rigging lofts, and see the heavy cables that are fashioned into the various parts of a sailing vessel's rigging, for there is the place where for two years Gust Isaacson has carried on an extensive rigging and sail business.

Isaacson is an old hand at the rigging game, having been before the mast in his youth with Scandinavian sailing vessels. In the early days in Seattle, when the waterfront was mostly water and little front, he helped rig some of the famous old ships that were built and sailed from here, such as the "Sterling." When the renewed activity in shipbuilding came to Seattle, Isaacson sensed the opportunity and went after the work. In the summer of 1916 he established his loft in the basement of the Central Building and there it has been ever since. He makes all the rigging there and then ships it down to the yard, where it is hung on the masts and the masts stepped while the ship is still on the ways. Despite the fact that Isaacson is an old-timer in the business, he has new ideas and keeps them working all the time.

For one concern, the Puget Sound Bridge & Dredging Co., he has completely rigged twelve vessels of the fourmasted baldheaded schooner type. In each one of these boats he has stepped the masts with the rigging hung, hung the blocks, reaved the manila and bent the sails before the

boat has left the ways. This is a record which has not been approached, not to mention not being equalled anywhere on the Pacific Coast, and it is doubtful if the Atlantic Coast can display such a feat.

With a Gin pole he picks up a 120-foot mast on which are hung the shrouds, back stays and spring stays and raises it into place from the ground beside the hull on its ways. Long before the hull is ready for launching, the rigging has been set and the other rigging work, even to bending the sails, has been completed.

In order to rig these twelve ves-

sels a very great amount of material was needed and here are some of the larger items: 60,000 feet of galvanized cable of all sizes, 90,000 pounds of manila rope, which, if stretched out end to end, would extend for more than fifty miles; 48,000 yards or 240,000 square feet of canvas, were needed to make the sails, and 1,500 blocks were used on the masts, gaffs and cargo gear.

A USEFUL BOOK ON HARDWOODS

To everyone interested in hardwoods in any form, whether it be in the way of lumber, logs, panels, flooring or veneers, etc., etc., the hardwood booklet issued on August 1st by White Brothers the large hardwood dealers of San Francisco is of great value and interest.

This booklet combines the complete price lists on every variety of hardwood lumber, panels, flooring, veneers, etc., and all valuable information such as weights, various tables for the measurement of logs, lumber and panels, the botanical names and habitat, etc., together with a list of the complete hardwood stock on hand at White Brothers spacious yards.

This combining into one booklet of the stocks of hardwoods actually on hand with their prices is a particularly happy idea just now inasmuch as the only commodity of interest to the trade is the stock which is actually here and ready for immediate delivery. Anything else can hardly be relied upon. White Brothers stock of hardwoods is an extraordinarily complete one and one which probably cannot be duplicated in any part of the country and certainly not on the Pacific Coast. In fact, this firm prides itself on being styled "Hardwood Headquarters" and it is surely a fact that anything in the hardwood line can always be had at White Brothers.



Raising a 120-foot mast by means of the gin pole. The shrouds, back stays and spring stays are all in place

RYAN TRIPLE GRIP ANCHORS

We present this month a cut of the new stockless anchor for which letters patent have been applied in all the foreign countries as well as the United States. This is the invention of Mr. Patrick J. Ryan of 30 Church street, New York City, well known throughout the country for the past twenty-five years as the representative of various steel casting concerns, and for the past five years representing the Hammond Steel Company and the Detroit Steel Casting Company in the Eastern territory.

Mr. Ryan was originally a part owner of the Baldt Anchor in conjunction with the elder Frederick Baldt of Chester, but through cir-

cumstances he parted with his interest in the Baldt Anchor to Walter Bickley and William Gelston.

Mr. Ryan claims that there has always been more or less fault found with the various types of stockless anchors on the market. A common fault recognized by naval architects was that the anchor would drag for a considerable distance before taking hold, or would foul or roll over on a sandy bottom. At the suggestion of one of the naval architects connected with a large shipbuilding plant in the South, Mr. Ryan was asked to devise an anchor that would prevent fouling or dragging and which would likely meet with the approval of the American Bureau of Shipping and have a very large and ready sale. As an

authority on the subject, well conversant with the needs of the service, and in order to meet all the requirements of the U. S. Navy specifications, Mr. Ryan hit upon the trip piece on the back of the crown.

The illustration shows the trip piece in position to take hold the moment it is grounded.

The shank has staggered teeth which operate in conjunction with the staggered teeth on the trip piece and each acting in an opposite direction to the other.

It is claimed for this anchor that absolutely no machine work is required, which brings the cost of same down to a minimum. It is simple in its construction and can be put on the market as cheap as any other.



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ELECTRIC WELDING FOR SHIPBUILDING

Reprinted from "LLOYD'S LIST,"
July 26, 1918

A special meeting of the Technical Committee of Lloyd's Register of Shipping was held yesterday to consider the subject of the application of electric welding to shipbuilding to the extent of eliminating by this method the use of rivets for important structural connections.

Electric welding has, of course, been employed for many years for ship-repair work, but its use has been practically confined to parts of the structure not likely to be exposed to important stresses. It is, in fact, only since the early days of the war that such appreciable developments have been made as to appear to afford justification for the extension now contemplated.

In view of the importance of the subject to the shipbuilding industry of the world, the Committee of Lloyd's Register of Shipping have recently carried out a series of carefully-devised experiments to determine, as far as can be done by means of tests and analysis, the general trustworthiness of structural connections effected by electric welding and their capacity to stand the strains to which they would be subjected in practice.

The Technical Committee had before them a report from the Society's Chief Ship Surveyor, setting forth in detail the results of these experiments, and dealing very fully with the whole subject.

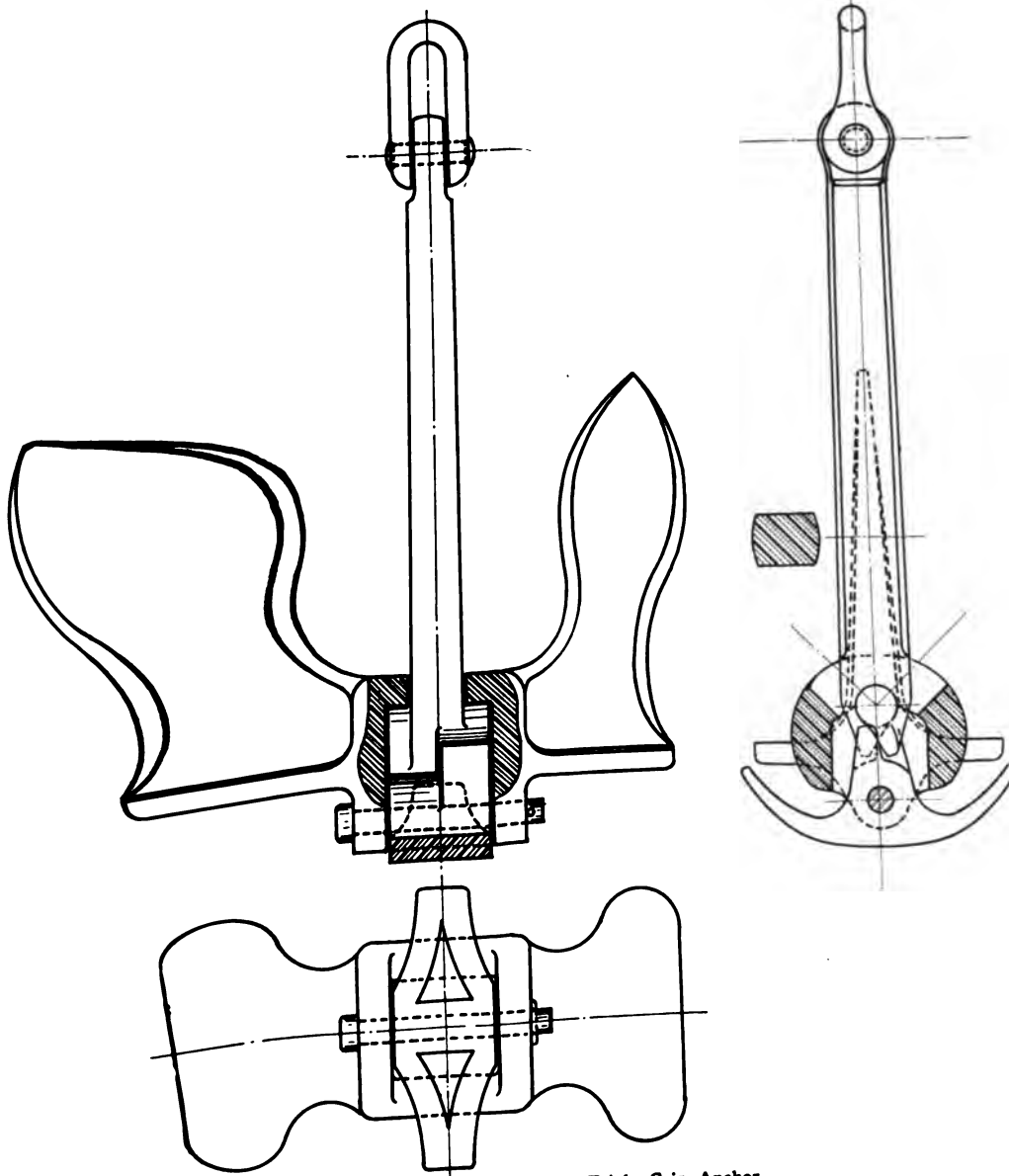
In order to assist the Technical Committee in their deliberations, and to afford others interested an opportunity of witnessing the system in operation, a demonstration was given yesterday at the Society's office in Fenchurch street.

Speaking at the informal luncheon which took place after the meeting of the Committee, Sir Thomas L. Devitt, Bart., said:—

"I would like to say in a few words how very pleased we are to have with us today the friends who have honoured us with their company to see what we have to show them regarding the proposed application of electric welding to shipbuilding. This subject is one of far-reaching possibilities, and when it came before our Committee some months ago, they considered that the Society should undertake some practical experiments with a view to testing the reliability of the process.

"These experiments have been carried out under the direction of Mr. Abell, our Chief Ship Surveyor, and with the kind co-operation of Messrs. Cammell Laird & Co., Ltd.

"They have been fully considered



Plan of the Ryan Triple Grip Anchor

Provision is also made that if the trip piece should by any means become broken the flukes would still operate, as the pin would form the seat of the shank.

The anchor will be made in all weights, from the smallest to the largest sizes.

Among some of the advantages claimed for this anchor is that the anchor takes hold instantly the moment it is grounded. The side flanges take hold simultaneously with the flukes and the more pulling strain put upon the shank the deeper the flukes sink into the mud, this being upon scientific principles, as the flukes being inclined downward, the more

pulling strain put upon the shank the deeper they must go down.

The only way to release this anchor is by "heaving to" and the anchor can never foul or roll over.

A core is provided in the back of the trip which allows the free transmission of water.

The strain on the head is equally distributed throughout the entire portion of the crown piece with strengthened fillets, insuring perfect solidity of metal and an equal strength throughout.

A number of orders has thus far been received and the outlook is very promising.



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Use No. 1 Extra Quality for filling deck and hull seams of Yachts and Motor Boats.

Use No. 2 First Quality Ship Glue or No. 3 Special Navy Glue for filling deck and hull seams of merchant vessels.

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No canoeist should be without an Emergency Can of our Special Canoe Glue.

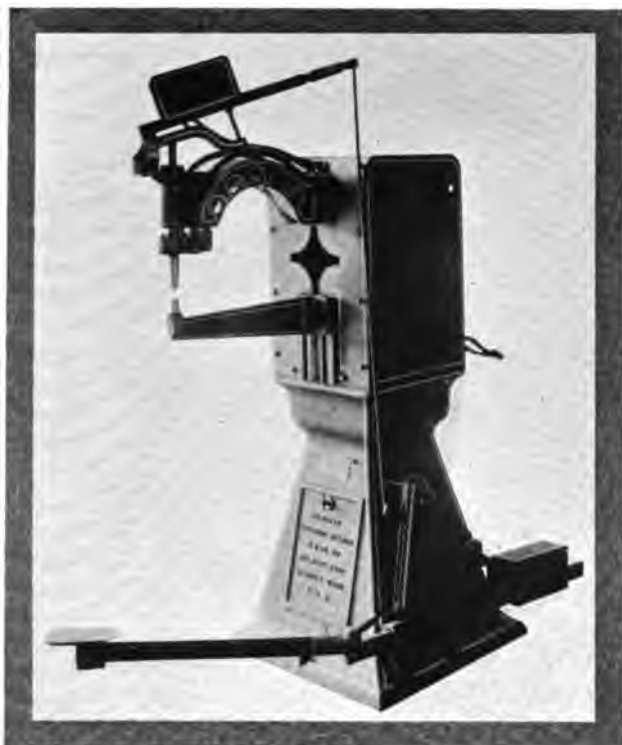
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smoother and cheaper.

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It rivets without the use of rivets.

It is all done quicker than we can tell about it.

Welding points can be made for varying kinds of work.

There are no mechanical parts to get out of order.

Die points can be changed in a minute's time.

We supply die points at a reasonable cost.

Give the welder a trial.

Send for price list.

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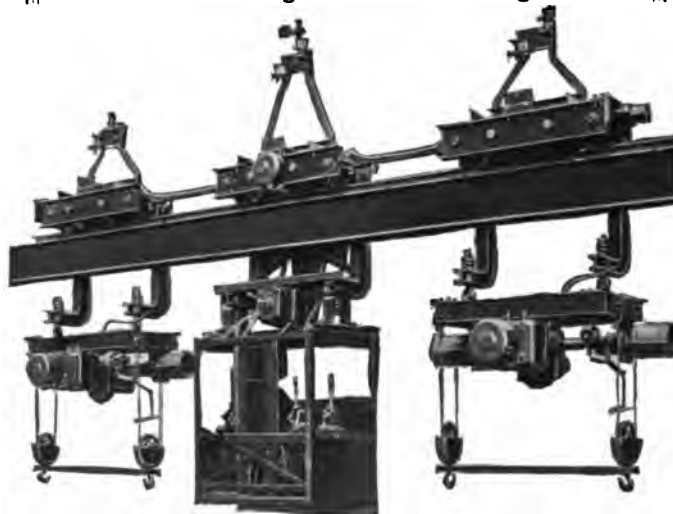


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PLEASE MENTION THE PACIFIC MARINE REVIEW WHEN YOU WRITE

by our Technical Committee at their meeting today, with the result that it has been decided to recommend to the General Committee that, under certain conditions to be adopted as a tentative measure, welding may be approved in vessels intended for classification in Lloyd's Register of Shipping.

"I need not enlarge upon the importance of this decision, which will be fully appreciated by this eminently practical assembly: I will only say that the Committee of Lloyd's Register of Shipping are pleased to place at the disposal of the shipping community of this country, and of all the Allied nations, the services of the Society's highly trained staff of surveyors, and of its distinguished Technical Committee, in the consideration of the many complex problems which we have constantly to face in naval architecture and marine engineering.

"The war has brought with it fresh problems in the realm of Naval architecture; and, speaking with a long experience in shipping, I can say without hesitation that never at any time has the Society of Lloyd's Register of Shipping been more anxious to act as 'the guide, philosopher and friend' of the great shipping interest, and never has it been better equipped to handle all such problems than it is at the present time.

"It affords me particular pleasure to welcome here today the honored representatives of our Allies in the

great struggle in which we are engaged.

"We have with us today Mr. Stevens, the Vice-Chairman of the American Shipping Mission, and Mr. Gordon, another member of that Mission, who is also a member of the American Committee of Lloyd's Register of Shipping, as representatives of our cousins and allies across the Atlantic, who, in pursuance of high ideals and in full recognition of the claims and humanity and civilization, are displaying such vast energy and vigour in support of the cause of liberty and international justice.

"We are likewise honoured with the company of representatives of heroic France, valiant Italy, and gallant Japan, and we join with them in praying for victory to our arms.

"May I say how pleased we are to have the company of Sir Joseph Maclay, and of the able members of his staff in the Ministry of Shipping? Sir Joseph Maclay has brought to the discharge of his most arduous office abilities of a high order, wide practical experience, and shrewd common sense, and he has done much by his capable handling of shipping to make it possible, like Joseph of old, to feed the people; for, in reality, Sir Joseph Maclay, as Shipping Controller, has also been the Food Controller, as without a proper use of our ships there would have been little food to control."

Remarking jocularly that he had

prepared a beautiful speech when he was getting up that morning, but that the only word of it that remained in his memory was the word "welding," Sir Thomas Devitt proceeded:—

"I have looked up the dictionary to see what welding means, and I find that to weld means, 'to unite or join together,' as two pieces of metal, by hammering or compressing them after they have been raised to a great heat. It also means 'to unite very closely,' and a paragraph out of an old paper dated 1885, dealing with the Irish question, states that it is desirable 'to weld the three kingdoms into an inseparable union of sentiment and heart, as well as of interest.' That sounds rather a nice sentiment for today. What is in the hearts of most of us is the desire for peace, a lasting peace, not such as the pacifists would give us, but a peace which would be an honourable one to this country. If we are united, or welded together like the samples we have just seen, then, with the help of the United States—and I cannot tell you what I feel about the United States, or where we should have been without that help—we shall achieve a speedy and decisive victory."

"On behalf of the Committee, I thank you very cordially for your presence here today, and I bid you a hearty welcome."

Air Occluders For Use With Condensers

THE successful development of ejector type of air removal apparatus within the past few years for use in connection with condensing equipment has been such that it is now recognized by the engineering profession as the best for this purpose. Its light weight, small space occupied and simplicity of operation make it particularly suitable for Marine Work requiring a high degree of vacuum to be maintained, operating with a minimum amount of steam and freedom from possible breakdowns on account of absence of moving parts.

The apparatus consists of two exhausters arranged in series, with an intercooler of either the surface or jet type placed between them. The first exhauster, known as the Primary

Nozzle, is connected to that part of the equipment from which the air and non-condensable vapors are to be removed, and is so constructed that the impelling steam entrains the air and non-condensable vapors and compresses them to the pressure existing in the intercooler.

The mixture of steam and ejected air and non-condensable vapors are then discharged into the intercooler, which by condensing the steam and cooling the air and non-condensable vapors, reduces the volume to be handled by the final or Secondary Exhauster. This in turn reduces the amount of steam required for operating the Secondary Nozzle, permitting the handling of high ratios of compression and, as a result, the quantity of steam required by the Primary

Nozzle is relatively small. Without the intercooler, the same quantity of air and non-condensable vapors would be handled, but a much larger quantity of steam would be necessary for operating the Secondary Exhauster.

The quantity of intercooler water required is small and it can be utilized for boiler feed make up. When used in connection with a surface condenser, provision must be made in the design of the condensate pump to handle the additional amount of cooling water necessary for the operation of a jet intercooler, although this item may be neglected if a surface intercooler is used. The temperature of the intercooler water should be the same as that used for condensing purposes.

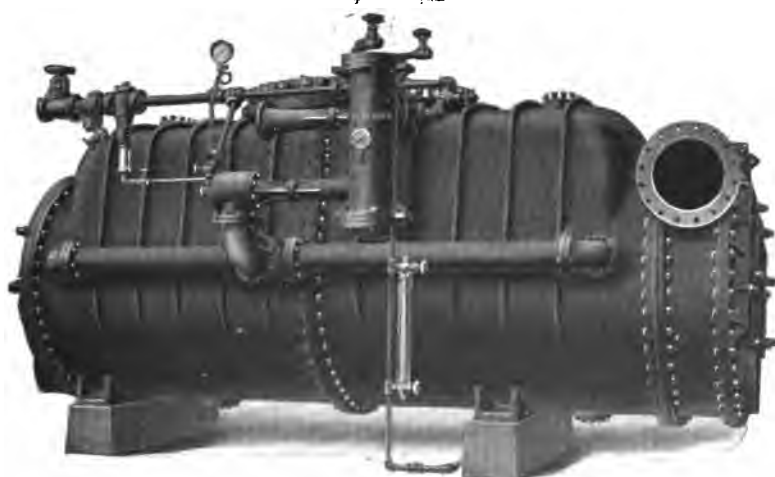


Fig. 1. General arrangement of the occluder



Fig. 2. Connections between an occluder and a surface condenser



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PABCO CALKING PITCHES are not only marked improvements over ordinary and, in many instances, makeshift materials, but have numerous distinct advantages:

They have the proper melting point, which enables them to withstand expansion and contraction without cracking.

Their exceptional fluidity permits quick and even flowing in paying narrow deck-seams.

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PABCO CALKING PITCH is made in three grades: No. 468, Medium Hard; No. 469, Hard; No. 470, Extra Hard.

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Newton Deck Plate Scarf Milling Machine

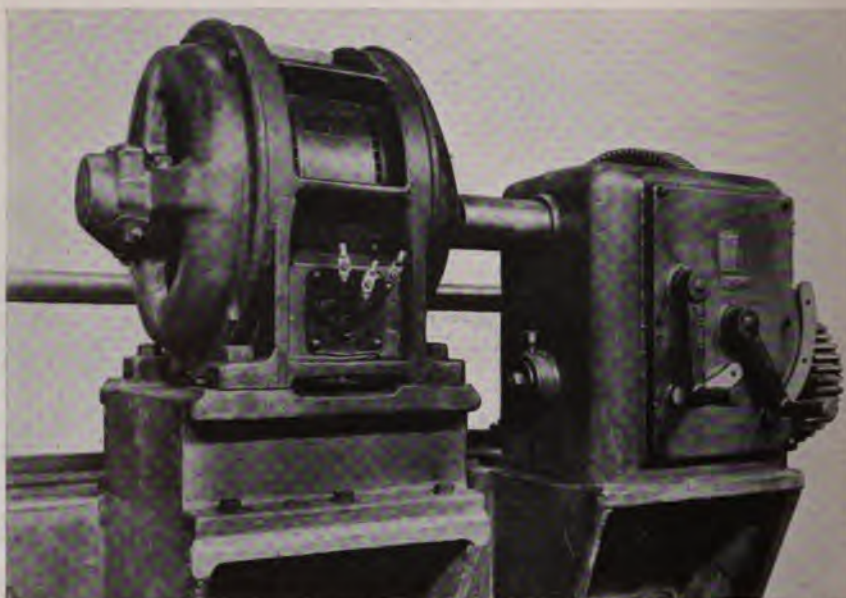
THIS machine has a spindle five inches in diameter, through the driving gear sleeve. The spindle has a vertical adjustment by hand through rack engaging the sleeve of ten inches. The maximum distance from top of table to end of spindle is 10 inches; the width between up-rights is 9 feet 2 1/4 inches; the length of feed available for the head on the cross rail is 9 feet.

The head has gear feed in both directions, and the spindle has hand-cross adjustment on the rail.

The top surface of the base is finished to serve as a work table for clamping the plates, and this is 9 feet 2 inches between up-rights, and 4 feet 9 inches wide at right angles to the cross rail.

The base has an oil pan cast solid which is equipped with pump, piping and attachments for carrying the lubricant to the point at which the milling cutters operate.

In the top surface of the work table are the tee slots, running parallel with the rails from end to end of the table, and a sufficient quantity of drilled holes for locating stops to take the side thrust of the cut and aligning slots are planed in the top surface of the table at right angles



Driving gear and 25 horsepower motor on the Newton Deck Plate Scarf Milling Machine

to the cross rail, to permit of locating the plates in the most convenient position and holding them square.

The cross rail of this machine was originally designed to be portable, and is, therefore, self-contained.

The drive to the spindle is by means of a worm and worm wheel, the worm wheel having a bronze ring with teeth of steep lead, and the driving worm is of hardened steel, fitted with roller thrust bearings, and are both encased for continual lubrication.

The motion for the drive is further transmitted through spur gears, and a speed box giving six changes, in which the gears are mounted on sliding sleeves controlled by latch levers in the cover in the rear, which gives changes without removal of gears, and motion is transmitted to this box from the 25 h. p. driving motor mounted on the rear of the upright.

The motion for the feed is taken from the right-hand side of the cross rail, and three changes are changed by means of change gears. This feed is available in both directions by means of a clutched double train of bevel gears at the right-hand end of the cross rail, but which are fully covered by guards.

As the bevells this machine mills are of various angles, it has been found convenient to have separate sets of up-rights, which are shown mounted between the rail and the base, and each pair of these is of a suitable angle for the respective scarfs, and provision is made through the use of aligning keys to insure the duplication of position when changes from one set of up-rights to another are made.

The spindle saddle of the above make is a very heavy construction, has the narrow guide aligning feature, and the vertical spindle sleeve is adjusted by means of a rack controlled by a worm and worm wheel by hand movement.

THE DE LAVAL TYPE OF MARINE POWER PLANT IS BECOMING UNIVERSAL



As soon as turbine and gear building capacity catches up with shipbuilding capacity, the De Laval type of geared steam turbine will be the only kind of power plant installed, on cargo boats particularly.

We already have orders for 2,000,000 h. p. capacity of De Laval Marine Gears, over 200,000 h. p. of which are for complete De Laval turbine units.

The Canadian cargo ship above shown is equipped with a De Laval geared turbine and was designed for 9 knots per hour. On the trial trip it developed 9 3/4 knots.

Many boats are being fitted with De Laval turbine equipment throughout, including propeller drive, circulating pumps, boiler feed pumps, lighting sets, bilge and cargo pumps, etc. This apparatus is fully described in our new Marine Catalog M-57, which will be sent upon request.

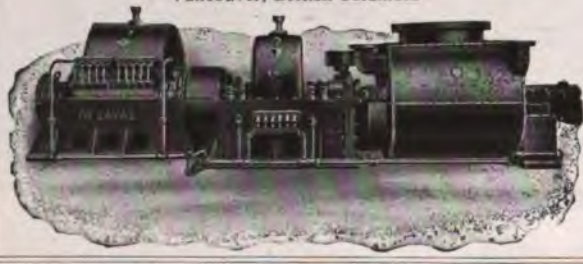
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Pacific Marine Review





Your Personal Duty Toward Essential War Work

BEAR in mind when you consider the oxygen situation that there are 118 fully-equipped shipyards in the United States, of which 48 are on the Pacific Coast, 38 on the Atlantic Coast, 16 on the Great Lakes and 16 on the Gulf Coast. In addition, 44 more yards are nearing completion.

A considerable part of the time saved in constructing ships in these yards is due to the use of Linde Oxygen in the Oxy-Acetylene process for welding and cutting metals.

We are being urged by the Government to contribute more oxygen—as the amount of production in essential lines is limited by the extent to which they can use the Oxy-Acetylene process.

It is extremely difficult to get more cylinders from the manufacturers, no matter how much we increase our production. To maintain our output we must therefore turn over cylinders far more rapidly than ever before.

While we are charging rental for cylinders not returned promptly, that does not entirely solve the situation. Important work is making constant demands for more oxygen, and the Government has a right to expect that you will make the return of empty cylinders the subject of an especial order to your employees.

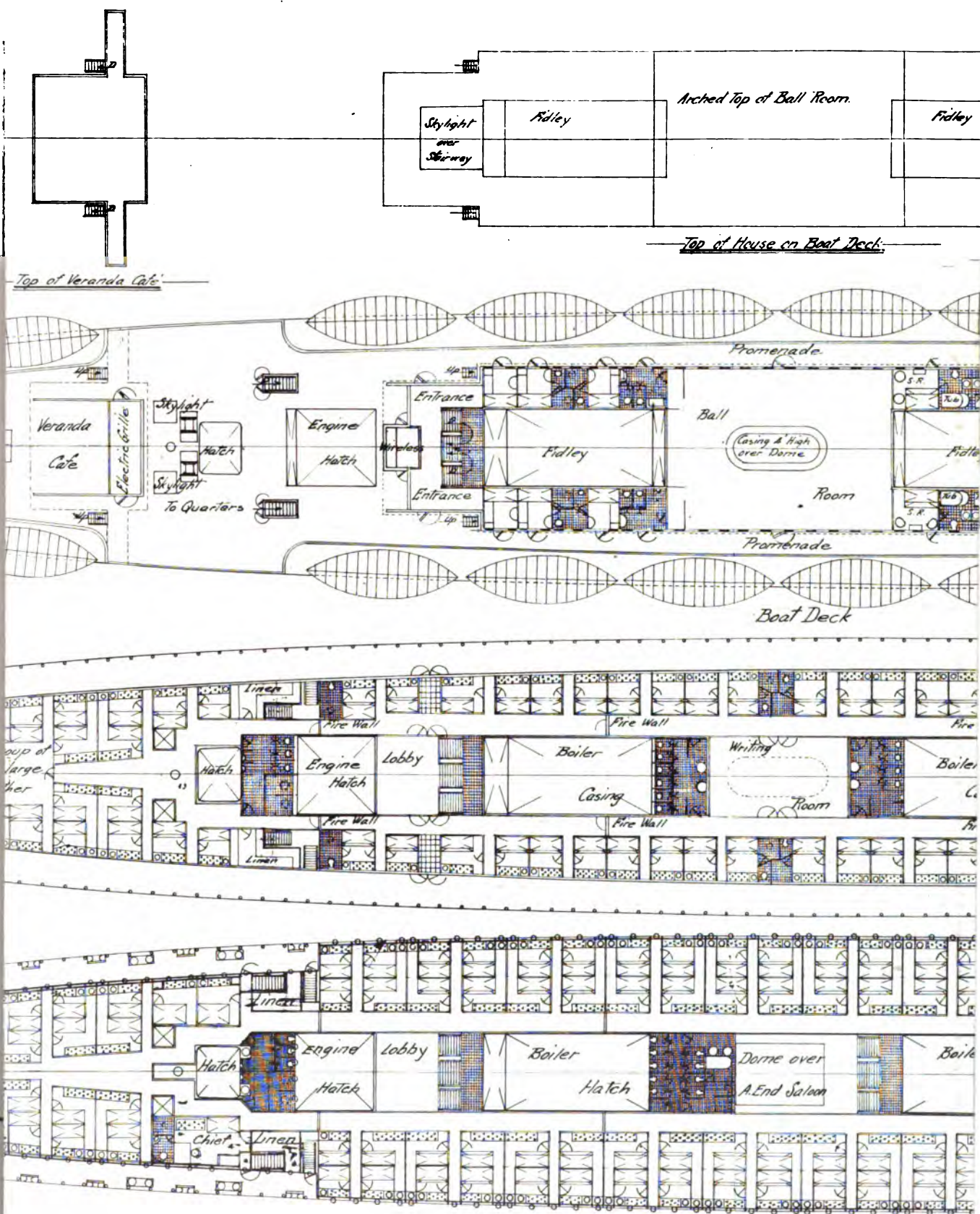
We ask you and urge you to do this, as a patriotic measure.

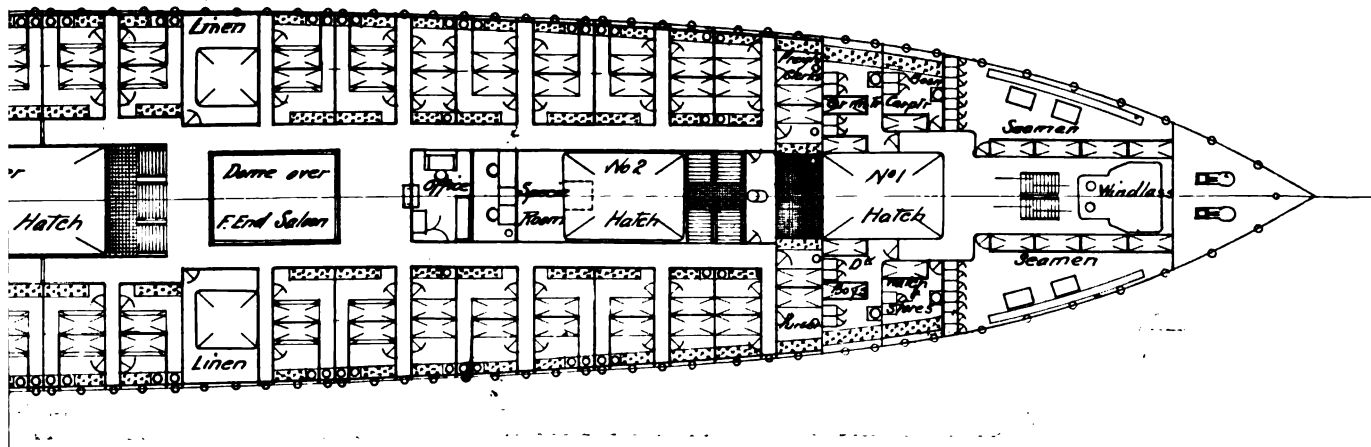
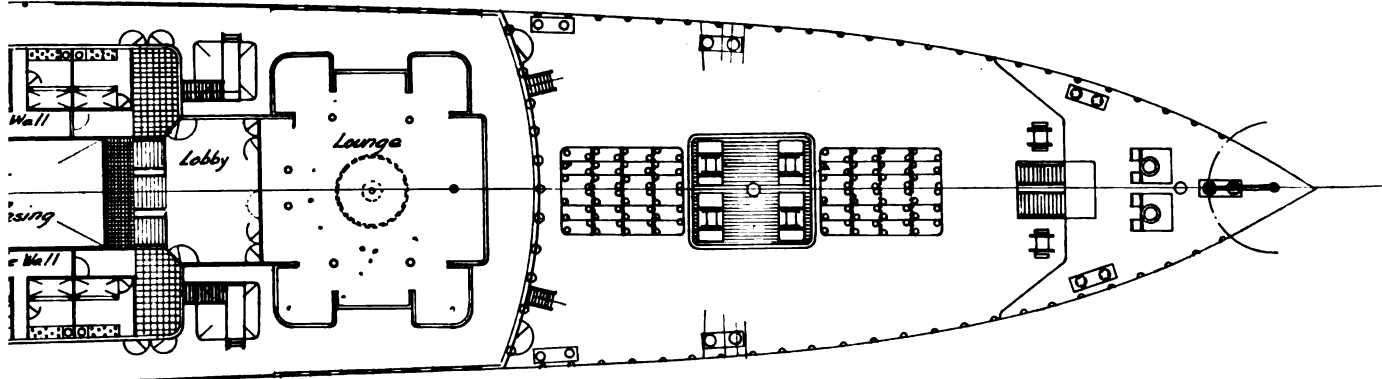
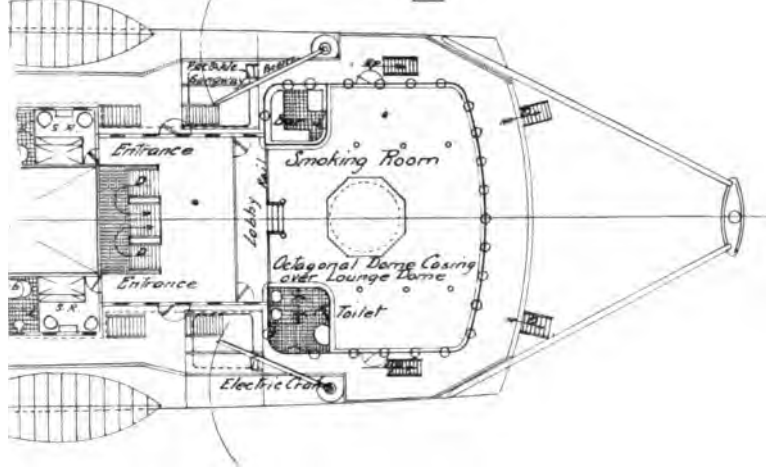
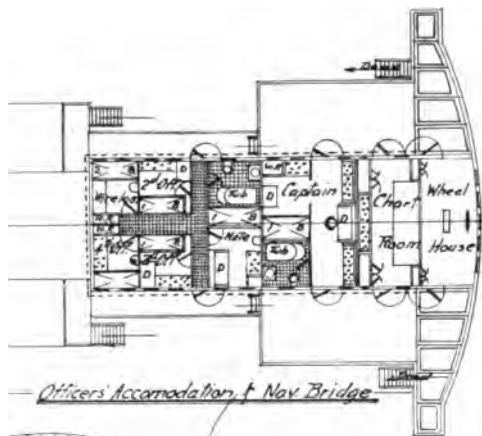
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TWIN SCREW PASSENGER AND FREIGHT STEAMER

429'-0" x 55'-0" x 36'-0" M.L.D. DIM.

Scale 1/16" = 1 ft

March 1916

G.W. Dickie, 24 California St. San Francisco. J.S. Dickie.

PACIFIC MARINE REVIEW

October, 1918

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The Design of Coastwise Shipping

WE are living in the day of standardized ship design. Our Government has undertaken the construction of a vast fleet of freighters, which is, generally speaking, divided up between a comparatively few sizes and types; a considerable number of refrigerator ships; a fleet of oil tankers and last, but by no means least, an appreciable number of big troop transports which at the close of hostilities will be transformed into trans-oceanic passenger liners.

Just what may be expected in the way of shipbuilding economy through the adoption of standard sizes and standard lines for ocean going freight ships remains to be seen. With the present prevailing high costs of material, labor and overhead there is but little actual or useful data to be obtained which can be applied to any prediction of future conditions obtaining with a return to normal world relations. It is possible to carry out fabrication on a large scale during war times when interior factories are attracted to such work, but during the piping times of peace the interior factory has other things to bother about besides turning out certain specified and finished pieces of material for ships' hulls. Again, the idea of the fabricated ship presupposes the necessity for turning out vessels in very large numbers and this necessity will always be with us. We believe that it can be clearly demonstrated that, as far as shipbuilding is concerned, that fabrication is a time saver rather than a labor saver, for no matter whether all the riveting on a hull is done in the shipyard itself or if half of it is done by outside shops where material is being fabricated, the total amount of riveting remains the same.

On the other hand, whether the really standardized ship comes with us to stay or not, the adoption of fixed sizes and types for ocean freighters will result in the cheapening of this class of vessel as many savings are eventually possible on continued repeat orders for the same boat. If we attempt, however, to apply the standardization idea to all classes of ocean transport service we run upon serious difficulties.

The operators and designers of large trans-oceanic passenger steamers will never take kindly to the "manufactured" ship. The spirit of rivalry in the matter of creature comforts for passengers; the old, and ill advised, hankering after speed on the part of both owners and passengers and the still more potent desire on the part of governments that their mail be transported as quickly as possible will all continue to demand special design and special construction for the big express passen-

ger liners. For these reasons it is highly improbable that the big ocean greyhound will ever lose her identity. We do not think that the vessels sailing on the great "Atlantic ferry" system will ever have numbers instead of names.

The vessel built for coastwise work, whether she be for freight, for passenger or for a combination of the two, is the least susceptible of all sea-going craft to standardization. The coaster deals with a great number of variables. The conditions to be met on different runs diverge widely. The character of the freight to be handled is different for each section of the coast and changes frequently even on the same run. The prevailing sea conditions call for variations in hull types and the climatic conditions necessitate a wide latitude in the matter of passenger accommodations and ventilation matters. Another and an almost insurmountable obstacle to standardization, especially among the smaller classes of coastwise vessels, is the condition of the bars at the mouths of many of the smaller harbors to say nothing of the wide divergence of port facilities once the vessel is inside the smaller coast roadsteads.

The best standard coasting vessel that could be designed for service along the North Pacific Coast of the United States and British Columbia might be very far from what was deemed proper for East Coast work and she certainly would not be anything like the best craft for Gulf of Mexico service.

It is the intention of this magazine to take up the discussion of certain types of steamers well fitted to Pacific Coast service and to illustrate these discussions with plans and the first type of vessel to be taken up will be the large passenger and freight steamer designed for the long round trip from Seattle to San Diego and return, calling en route at San Pedro and San Francisco.

Determination of Type and Size

There are certain peculiarities along this extensive stretch of coast which effect the design of steamers as well as their construction. The coasting steamers in these waters are called upon to face a great deal of heavy head weather when running north from San Francisco and this heavy weather prevails practically throughout the Summer months. This is the reason why vessels built especially for this service usually have the hull plating carried right forward the full weight rather than taking advantage of the classification rules which permit of lightening of the plating fore and aft. The presence of a great deal of head wind and head seas on the run north also makes it advis-

able from the passenger point of view to have a large amount of freeboard forward.

The waters of the Pacific ocean in the path of coasting vessels are quite cold, ranging from fifty to fifty-eight degrees from the northerly end of the Santa Barbara Channel to Puget Sound. This slight range in temperatures probably covers Winter as well as Summer conditions, but the ship making the round trip from Seattle to San Diego is called upon to traverse several hundred miles of warm waters on the southern end of her trip. This creates an interesting ventilation problem.

The question of freight and passenger capacity is naturally a difficult one to solve. Coasting vessels are subject to wide fluctuations from trip to trip in the amount of freight offered and also in the number of passengers transported. Both items seem to vary from natural and well understood causes. South bound freights contain a large proportion of cereals, flour, canned salmon, and other crated, sacked or canned goods, while north-bound general merchandise makes up a large proportion of the cargo. On account of these variations it is not a bad thing to have the measurement capacity of the vessel's holds exceed to an appreciable extent the actual tonnage carrying capacity.

The fluctuations in passenger traffic are quite marked. Vacation season, weather conditions and the economic situation all affect travel heavily and for this reason a large vessel should be as comfortable as possible and be fitted with every convenience that would tend towards enabling her to hold the cream of the traffic for herself against competitors when travel was slack. If possible, the second class passenger accommodations should be done away with, or at least compromised so that the passengers occupying second class staterooms eat in the first-class dining salon. Limited third class accommodations are practically a necessity as there is a fixed demand for this class of travel.

We believe that on the large passenger boats on Pacific Coast runs that the three berth stateroom should be entirely done away with on new vessels as practically the same total accommodation can be secured in two berth rooms. Greater attention should also be given to the design of special staterooms on shipboard and their number on the large steamers should be materially increased. The extra revenue to be derived from such rooms more than compensates the original cost and the number of passengers who are anxious to pay for special accommodations is always increasing. All of these questions will be taken up later and discussed in detail when describing the vessel whose general arrangement plans are shown herewith.

It will be noted that our proposed vessel is fitted with an electric drive. In this connection we may state that the main reason for adopting this drive is that it is comparatively new, that it has been and still is being widely discussed; that, aside from the question of economy and its mechanical advantages and disadvantages, it has many things to recommend it for passenger ship use, and finally that its use does not necessitate any structural change in the ship here shown that could not easily be altered to suit either reciprocating engines or steam turbines.

General Description of Proposed Passenger and Freight Coaster

The plans shown herewith call for a vessel 429 feet long between perpendiculars, 55 feet moulded beam and 32 feet moulded depth to the upper deck. The engine room installation contemplates the electric drive, twin screws with 5,000 horsepower on each shaft.

Referring to the plans, the main or "E" deck shows some radical departures from the usual coaster design where the engines are amidships. Of the four main holds, three are located forward of the forward boiler room and Number three hold is served by side hatches which are trunked up through to the bridge deck, the cargo being handled by electric cranes. Aft of number three hold is the forward boiler room with three double ended Scotch boilers, fired fore and aft. In order to assure low boiler room temperatures, the boilers would be cased with an air film and this air between the boiler and the outer casing would be utilized for forced draft. Between the forward and after firerooms, which are identical, would be located the steward's cold stores and refrigerating space. This permits of excellent arrangements from the point of view of the steward's department as the major part of the stores are centralized, elevator service provides ready access with the pantry for delivery and with the thwartship passage for the acceptance of all classes of steward's supplies. Separate refrigerating compartments are provided for foodstuffs requiring different temperatures and the refrigerating machinery itself is located right alongside the refrigerating space. Aft of the after boiler room is the engine room, a description of which will be given later on, and on this deck one engine room wing is occupied by firemen's quarters and the other by the ship's machine shop. Aft of the engine room is number 4 tween decks and then sleeping quarters for the third-class passengers. Right aft on this deck is the steering gear.

The Upper Deck

Commencing forward on the upper, or "C", deck we have first the crew and petty officers' wash rooms, then the carpenter's and boatswain's rooms. Abreast of number one and two hatch trunks and extending aft to the forward end of the main dining saloon are twenty-two staterooms, together with toilet accommodations and large linen room. There is a large double stairway connecting these quarters with the shelter or "C" deck. Aft of these accommodations and extending the full width of the ship for a length of 112 feet is the main first class dining saloon. This room is reached from the main passenger deck above by means of a double grand stairway, one at either end of the forward boiler room hatch trunk. Two large light domes would add materially to the richness of the main saloon, while the side hatch trunks for number three hold would serve to relieve the room from monotony due to its great extent and at the same time furnish the means of securing fine side-board effects at a location in the saloon where side-board would be of the most benefit to the waiters. It will also be noted that the deep frames, necessary in such a long space without bulkheads, form side alcoves which would be susceptible of fine architectural treatment. In the seating arrangement shown herewith it will be noted that there

are forty tables provided for two each, thirty-eight tables for four each, the chief engineer's table seating ten and the Captain's table seating sixteen, a total seating capacity of 248, or on two sittings sufficient accommodations for about 490 first class passengers. Aft of the dining saloon and occupying the full width of the vessel for a distance of 60 feet 8 inches are the main galley, vegetable room, scullery, wine room, butcher's shop, steam table, steam kitchen, etc. Aft of the galley there would be the third class dining room, officers' mess rooms, seamen's and firemen's mess rooms, quarters for a large section of the steward's crew, etc. Right aft on this deck there would be quarters for waiters, also a waiter's lounging room.

The Shelter Deck.

The shelter or "C" deck is the main passenger accommodation deck on the ship. Right forward is the windlass on the center line and large seamen quarters and abreast of number one hatch trunk quarters for the carpenter, boatswain, quartermasters, watchman and deck boys. A bulkhead at the after end of number one hatch casing separates these quarters from the passenger accommodations which extend from this point clear aft. Immediately aft of this bulkhead are quarters for the purser and freight clerks, together with toilets and shower baths. Aft of number two hatch casing and on the center line is the ship's office, freight clerk's office and specie room. Aft of the after grand stairway leading to the main dining saloon below is a lobby. Forward of the after boiler room hatch and on the center line is a battery of toilets, tubs and shower baths, while a second group of these is similarly located between the engine room hatch and number four hold hatch trunk. A state room and office for the chief engineer is provided on the port side of this deck abreast of number four hatch casing. The side plating is cut away making the after end of this deck a weather deck for about 108 feet and this provides a promenade deck for third class passengers and members of the steward's crew. The after end of this steel enclosure between the shelter and bridge (C and B) decks has been arranged as a third class smoking room and is reached directly by a stairway from the third class quarters below. The first class passenger rooms on this deck are arranged in double tiers, the inside room having an alcove to the side of the ship with a port light, virtually making all the rooms outside rooms. There are 114 two-berth state rooms on this deck and two special state rooms, giving accommodations for 232 first class passengers. It will be noted that the arrangement of these rooms brings the wash basins in state rooms all on one line, thus simplifying the piping system for running fresh water and the same idea has been carried out on the deck above.

Bridge Deck

On the bridge deck a circular steel bulkhead with dead lights separates the cargo working space on this deck from the passenger accommodations and permitting promenade space entirely around the steel deck house on this structure without interfering with the working of ship or cargo forward. There are four main entrances to this house from the promenade space, two being just aft of the main lounge and the others somewhat aft of amidships. Toilet and shower bath accommodations

for this deck are arranged in three groups along the center line and large linen lockers are arranged around the accommodation ladders to the shelter deck promenade aft. There is a large lobby forward opening directly on the main lounge and also to the toilet promenade entrance lobbies. The main lounge is 32 feet long and 38 feet wide, fitted with large plate glass windows and also lighted from overhead by the glass dome on the smoking room above. Aft of the main lounge and lobby there are forty outside staterooms for two passengers each, six two-berth rooms with private toilets and shower baths attached and a special party suite arrangement comprising seven staterooms with bath, toilet and shower bath arrangements. This special suite has its own entrance and lobby and its own parlor, 22 by 12 feet in size. The passenger accommodations on this deck then comprise 53 staterooms for 106 passengers, thirteen of which are fitted with special features. All the passenger accommodations on this ship are divided by three complete fire walls. The accommodation ladders shown over the hatches from number three hold are of course removable.

From the curved bulkhead aft of number two hatch, the side plating has been carried up to the boat deck, forming an enclosed promenade in the way of the main lounge.

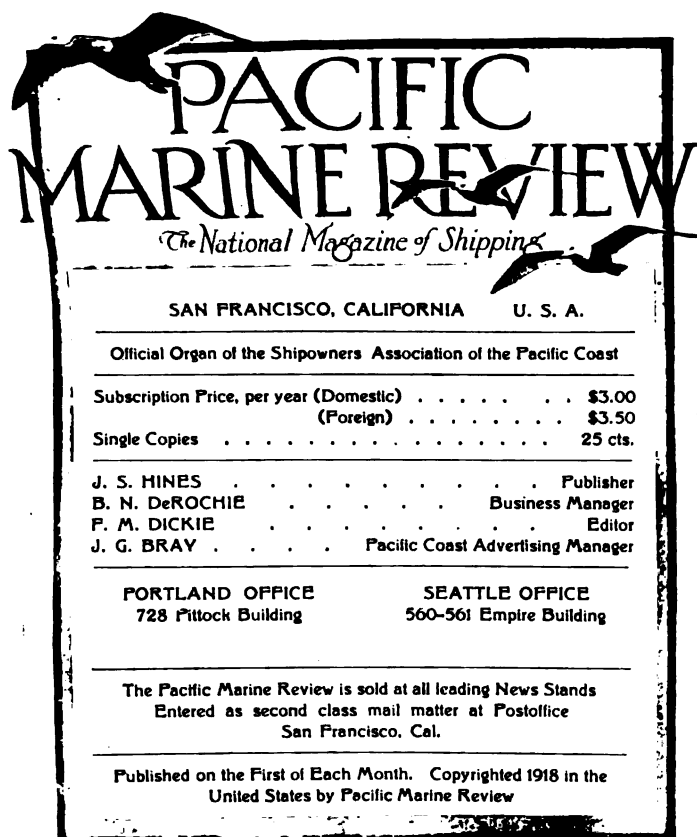
Boat Deck

The boat or "A" deck extends for about 310 feet and furnishes additional promenade space as well as several unique features. At its forward end is the first class smoking room communicating directly with the lobby at the head of the forward grand stairway. In the way of the forward boiler room casing are provided four special staterooms with baths attached and six similar staterooms are provided in way of the after fire room casing. This gives a total of 209 staterooms or 418 passengers at two to the room. The accommodations have been made elastic, however, and one hundred of the rooms have wide settees arranged with rods and berth curtains, all of which would be utilized in case of a rush. The space aft of the forward fidley, 31 feet wide and 44 feet long, has been utilized as a music and ball room. Far aft on this deck there is an electric grill and verandah cafe, the roof of this enclosure serving as the after bridge.

The bridge house over the forward end of the boat deck contains the enclosed bridge forward, the chart room, the captain's quarters and living accommodations for the deck officers and wireless operators.

It will be noted that there are several departures from the accommodations usually found on vessels engaged in the coasting runs on the Pacific. Perhaps the most radical of these is doing away with a large number of tub baths in favor of the shower bath. We believe that the shower bath is preferable on short trips. Again, the public rooms are planned practically devoid of built in furniture, as a ship of this size should be steady enough at sea to permit of the use of all loose furniture. The boating arrangement, as shown, calls for twelve thirty-foot life boats.

A further discussion of this type of steamer and of some of the details of her design will be gone into more extensively in a later article.



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BACK THEM TO THE LIMIT

WE have been ready for a year to give up the St. Mihiel salient," said the Kaiser, and the world for once agrees with his utterance, having observed for many years that any burglar is willing to give up anything he cannot carry off.

Had the Crown Prince (or the able generals whose credit he steals) been able, however, to sweep past Verdun, the Kaiser would long since have "Germanized" St. Mihiel as thoroughly as he has "Germanized" Antwerp and Louvain.

And while the Kaiser, protesting, in his latest peace offensive, that Germany did not want France, Belgium, or indemnities, the Kaiser's men, in their thorough German way, carried off all the able-bodied males in their retreat before Pershing's victorious army.

It is this utter inability to observe the smallest decencies that reveals the German character, unchanged from the day of the "scrap of paper" protest, and from the day the Lusitania medals were struck off in readiness to commemorate the murder of the women and children on that ship.

Peace with Germany will come when the German nation, like its weakening soldiers, grovels on its knees and cries, "Kamerad", and another "unconditional surrender" will be written down in history.

The German is not yet beaten. The Allies do not expect to end the war before next year. Our casualties have been large and will be larger. Our sacrifices have been great and must be greater. Victory will be won one step at a time.

The next step toward victory, and the one whose success depends, not upon our army, but upon civilian America, is the Fourth Liberty Loan. The call must be met promptly for the glory of the United States and the inspiring of our men abroad.

THE VALUE OF STANDARD TYPES

THE decision of Charles M. Schwab that each shipbuilding yard in the East stick to one type of ship and perfect and standardize that type as far as possible will result in considerable speeding up in those plants which are now building vessels of various kinds and sizes. In this connection, Charles Piez, vice-president and general manager of the United States Shipping Board Emergency Fleet Corporation, made the following statement: "There is not a single old yard on the Atlantic Coast which is devoted wholly to the construction of a single type of vessel. Tankers, cargo and passenger vessels are found in one yard multiplying the problems of management and putting heavy brakes on the output. But everywhere in the East there is developing the spirit that the West Coast records shall not go unchallenged, and an aggressive determination to surpass the western records is manifesting itself". The wide divergence of ship types always found before the war in the older American shipyards was the result of the small shipbuilding output of the country rather than the cause of it. It was not until the starting of the present shipbuilding program by the United States Shipping Board that there was any demand for one type of vessel sufficient to warrant a shipbuilding company in going in for specialized work. In this respect the British shipbuilder had a distinct advantage owing to a continuous demand for tonnage, a large proportion of which was in tramp freighters. However, there are a large number of American yards building one class of vessels and the number of such yards is rapidly increasing as the vessels on order before the United States entered the war and those appearing on the first programme of the Shipping Board are gradually finished and a more careful distribution of work among the yards is being carried out. From the standpoint of efficiency of the yards and speed of output, the one ship type to the plant idea will be productive of good results and while the idea has the drawback of destroying, to a certain degree, the initiative among ship designers, this drawback can be safely overlooked during the present conflict.

SHIPYARD PLANT GROWTH

At the end of August the shipbuilding facilities of the United States stood as follows: There is a total of 171 shipyards, 76 of which are for steel construction, 86 for wooden ships, seven for concrete construction and two which are building composite vessels. One hundred and thirty-two of the yards are practically completed and are actively building ships or now laying keels while the remainder have passed the half-way mark. These yards have a total of 846 building ways. If we accept two ships per year per set of ways, and this is moderate enough, and 5,000 tons deadweight as the average size of vessel, the potential output of these ways when all are working would be 8,000,000 deadweight tons per annum.

The American ship deliveries for the month of August totalled sixty-six ships of a deadweight tonnage of 340,145 as compared with 295,000 deadweight tons in June, the best previous month.

WORK FOR THE REAR GUARD

THE opening of the present month finds us in the midst of a great Liberty Loan drive. The people of the United States have been asked to make the most immense investment of funds ever attempted in the world's history. No one has attempted to belittle the task before us and its success can only be accomplished through the wholesale co-operation of every man, woman and child within our borders. There is only one sum that any American has the right to subscribe and that is the absolute limit of his means.

It is now so well understood what we are fighting for that it is almost banal to repeat the many arguments that are usually presented to induce us to buy liberty bonds. A man usually feels somewhat like a gambler when investing his money and most people like to take a "flyer" at something or other in the hope that it will pan out "big". It is always an excitable and pleasurable feeling that possesses one when he plunges into some business proposition head over heels, and here is a chance for us all to be "plungers", and plungers in the safest investment in the world.

Every one of us had high expectations of what our boys would accomplish in France, and the boys have already made some of us feel foolish because they have done so much better than we thought they would. Armies of trained veterans who have seen years of service in the intricacies of modern warfare are loud in their praises of the American soldier, and it certainly adds to our pride that the German soldier has become heartily sick of him on a very short acquaintance.

The American army has left us with a grave responsibility. We constitute the rear guard. The man at the front has not failed us, and if we fail him we are no longer worthy of the name Americans. Let each and every one of us put his or her shoulder to the wheel and prove to the German autocracy that it has the American people at home, as well as the American Army and Navy abroad, to deal with.

HARBOR IMPROVEMENTS AND THE FREE PORT

THE tentative announcement by the head of the State Board of Harbor Commissioners in reference to the proposed improvements at Islais Creek and India Basin bears a double significance at this time, when the free port question is still an issue with the shippers and merchants of several large American ports. The first and essential need of any free port is a large amount of level land adjacent to deep water frontage, where factories and warehouses can be constructed to take care of the reconditioning and manufacture of materials destined for re-exportation out of the country. While no one can at the present time venture to predict whether San Francisco will be named at some time in the future as a free port or not, it is fortunate that any waterfront preparations that may be made in anticipation of free port conditions will not be wasted, as there is nothing to be lost one way or the other in preparing a large factory and warehouse waterfront district. If, when the question of free ports is finally decided by Congress, San Francisco is prepared with a waterfront district which will meet

the requirements, this fact will go a long way towards convincing the powers that be at Washington that San Francisco is a proper location for a world mart.

RIVETLESS STEEL STRUCTURES

THE first steel vessel constructed entirely without rivets was recently launched at a yard on the Southeast Coast in the presence of Lord Pirrie, the Controller-General of Merchant Shipbuilding, and other representatives of the Admiralty and War Office. She has since been in service with full cargo during exceptionally rough weather, and satisfactorily answered in every way to the severe tests imposed. The object of the experiment, to which considerable importance was attached by shipbuilding authorities, was to prove the ability of welded construction to withstand the strains peculiar to a ship at sea. This principle having been established, it is not proposed altogether to dispense with riveting, which in certain sections is cheaper and quicker than welding. It is intended, however, that future vessels should be a combination of riveting and welding. The United States Shipping Board, for instance, having been in close touch with the experimental work, are making arrangements for the construction of a number of 10,000-ton standard ships in which the use of rivets will be reduced to 2½ per cent of the number originally required. The vessel welded was a barge 125 feet between perpendiculars and 16 feet beam, with a displacement of 275 tons. The hull was rectangular in section amidships, with only the bilge plates curved. It was built up of 71 transverse frames and contained three bulkheads, those fitted fore and aft being watertight, and the one amidships non-watertight. The shell plating was one-quarter inch and five-sixteenth inch. With the more difficult welding, such as the vertical butt joints on each shell plating and overhead work underneath the keel and on bilge plates, it was noted that the quality of the welds was excellent. For this overhead work special electrodes were employed, and proved well worth the slightly increased cost. All watertight joints up to and including the underside of bilge plates were continuously welded both inside and outside, the other watertight joints being welded continuously on one side and tack welded on the other. On the shell plating, the continuous welding was on the outside in all cases. For internal non-watertight joints and frame construction, tack welding was adopted, the length of welding being carefully calculated to give a margin of strength over a similar riveted joint. The following details of the comparative cost of the electric welded and riveted barge are interesting:

In labor 245 man hours were saved in construction, which can easily be improved on in future work. More than 1000 pounds of metal was saved, owing to the absence of rivets, but greater economy will result when the design is modified to suit electric welded ship construction. The total cost of welding was \$1500, detailed as follows: Electrodes, \$890; electric current, \$300; men's time, \$310; total, \$1500. It is realized by the Admiralty experts that the proportion of cost for electrodes is high, but this is mainly due to the present limited demand. Demand and competition will have the usual effect and should reduce the cost of this item.

at least 60 per cent. It will then be possible to build a vessel of this size with an estimated saving of from 25 to 40 per cent of time and about 10 per cent of material. As a result of this demonstration, the yard has prepared a new design of barge in which it is proposed to incorporate electric welding and riveted construction to the following extent: To be welded—Coamings, shell seams to frames, deck butts to beams, bulkheads (including boundary bars), keel plate butts to be welded overlaps, after shell seams welded. To be riveted—Floor riveted to frames, beam knees to frames and beams, frames clear of shell seams.

FIGURING SHIP COSTS

DURING the latter part of September, the United States Shipping Board has been appraising the construction costs of the various types of ships being built. In this connection it must be remembered that the task of arriving at actual ship costs under present conditions is well nigh impossible. There are many elements entering into the problem which are susceptible of many modes of figuring that the purpose of the appraisement—securing relative ship construction costs between vessels built here and in other countries—may not be attained with any degree of certainty. Labor, material and overhead costs are all inflated while the costs of maintaining armed guards at shipyards and Shipping Board district offices and corps of inspectors all call for special treatment. While these same items of expense exist in other shipbuilding countries as well as here, there always remains the possibility of their being treated differently for appraisement purposes, thus making the comparisons arrived at incorrect. In speaking of the Shipping Board's efforts in this direction, Mr. Hurley stated:

"The cost of producing ships during the war is by no means confined to labor and materials. The cost of both inevitably has been high, but the trouble we anticipate in getting our approximation is due to certain extraordinary measures that had been taken, the cost of which had to be imposed on the yards. Armed guards to protect shipyards and ships under construction, and establishment of district offices which provide means of Government supervision form typical items of extra expense. Segregation of many such items from the actual cost of constructing a ship involves many accounting difficulties. Delays in the arrival of material, cost of training new labor—all must be figured out in terms of dollars. It is a tremendous job, involving possible amortization of actual war costs after the war, but a start has been made and the job will be carried through to completion."

ADVANCES AND LOANS

The Allied Nations are making promising advances on all the war fronts. The military situation has assumed a phase that has caused every American a deep sense of satisfaction. In the meanwhile, however, we have our own drive to attend to at home, the Fourth Liberty Loan Drive, so let us show the boys at the front that we can put one over on the enemy right here and with the drives over there and over here working in harmony the war will only be ended in one way and that way will be the right way.

THE FLUCTUATIONS OF WAR RISK INSURANCE

WE HAVE been reading in the daily papers how allied vessels of the world have been destroyed from month to month, the figures generally being given in tonnage and running up into such tremendous figures that at times it would seem that no boat could be expected to arrive at her port of destination in the much vaunted prohibited zone of the enemy.

For quite a period of time before the plan was adopted of convoying the vessels, a great number were sunk and this is shown in the table given below by a comparison of the rates of insurance charged at that time with those at the present time, when comparatively few are sunk, due to the wonderful work of the allied and the United States destroyers.

In the years 1914, 15, 16, 17 and the first half of this year the Trans-Atlantic rates varied as follows:

October	1, 1914.....	1%
January	1, 1915.....	1½%
April	1, 1915.....	1½%
October	1, 1916.....	1%
October	25, 1916.....	1½%
November	2, 1916.....	1¾%
November	28, 1916.....	2½%
December	1, 1916.....	4%
January	1, 1917.....	6%
January	17, 1917.....	6½%
January	19, 1917.....	9½%
February	7, 1917.....	8%
February	14, 1917.....	7½%
March	1, 1917.....	8%
March	15, 1917.....	10½%
March	26, 1917.....	9½%
April	10, 1917.....	10%
May	1, 1917.....	11%
June	1, 1917.....	11%
June	13, 1917.....	10%
July	12, 1917.....	9½%
August	1, 1917.....	10%
September	1, 1917.....	10%
September	20, 1917.....	9½%
October	9, 1917.....	7%
November	1, 1917.....	5½%
November	15, 1917.....	5%
January	1, 1918.....	4½%
February	1, 1918.....	5%
March	11, 1918.....	4½%
March	21, 1918.....	4%
April	1, 1918.....	3½%
April	24, 1918.....	3%
June	1, 1918.....	2¾%
July	1, 1918.....	2¾%

The reader will note that on the first of July the rate was as low as 2¾%, and on a boat having a speed of over 18 knots, a reduction of 1½% was allowed, bringing the rate down to the very low figure of 1¼%.

The above rates apply only to the voyage from Atlantic United States ports to the United Kingdom. While the Pacific Ocean has never been considered as dangerous from an underwriter's point of view, the same ratio of deductions in rates has prevailed, varying from 10% at the outbreak of the war for the voyage from San Francisco to Oriental ports, to the present rate of 1/5%.

Our Freight Handling Problems

ANY discussion of handling facilities applicable to the needs of such a port as San Francisco must necessarily assume that it is a far easier task to point out what is lacking than to specify what should be done to remedy that lack. The crux of the situation is that we have splendid wharf accommodations for vessels, but that we do not use modern or efficient methods of moving freight to and from these wharves—indeed, our methods of moving freight from the wharves is so slow that congestion often occurs. Every seaport of importance the world over has had to face the same problem and the methods employed in overcoming the difficulty have varied widely. However lax we have been here in San Francisco in attempting to increase waterfront efficiency, we at least have the advantage now of surveying what other ports have done, choosing that which has proven efficient elsewhere and discarding those elements of freight transference which have proven costly experiments.

Where ample level ground is available and a long, continuous stretch of deep water frontage is to be had, the quay wall provides undoubted advantage as compared to the wharf structure jutting out into the harbor. The wharf, it is true, increases the berthing space available in a given length of water front, but at the same time it creates a number of "bottle mouths" through which freight is compelled to ebb and flow. San Francisco, however, as far as the present waterfront is concerned, is a wharf problem and could not well be otherwise, and as to the utilization of the present unimproved water fronts there is an excellent opportunity to apply the quay wall in these localities.

In order, then, to apply the experience of other ports to San Francisco's problem, we must accept the wharf as a part of that problem and only use other wharf systems in comparison. The port facilities of the City of Greater New York have been developed largely by private enterprise, but such has been the magnitude of some of the works carried out that certain private terminal systems will bear comparison with the entire water front of ports enjoying only a fraction of the amount of trade flowing through the great eastern metropolis. The oldest and most important dock development in New York is that of the New York Dock Company, situated on the Brooklyn shore of East river, directly across from the lower end of Manhattan. This company's property covers approximately two and one-half miles of water front. The company's piers total 34, the longest being 1193 feet in length and covering 175,000 square feet (a wharf, it will be noted, which is rather narrow for its great length) and the total pier dockage is 61.5 acres. The berthing measurement is 9.36 miles. The berthing measurement on San Francisco's water front is about 12 miles and the pier dockage about 120 acres. Roughly speaking, 7,500,000 tons of ocean-going, coasting and bay craft were accommodated at San Francisco in 1916, while some 12,000,000 tons, made up of 1422 ocean-going steamers and 57,549 berthings of barges, harbor boats and small craft of all descriptions, were taken care of by the New York Dock Company's system. The percentage of all dock capacity at San Francisco

utilized in January, 1918, was 54 per cent, so it is evident that the New York Dock Company's percentage must have been considerably higher than this. The higher tonnage accommodated at the New York Dock Company's wharves on a considerably lower berthing space is partly accounted for by the very large size of the ocean steamers and the use of lighters on the off-side of the vessel for unloading, this practice being the same in effect as a considerable increase in berthing space would be, but the real reason for the major portion of the discrepancy will be found in the great warehouse system maintained by the New York concern immediately adjacent to their wharves.

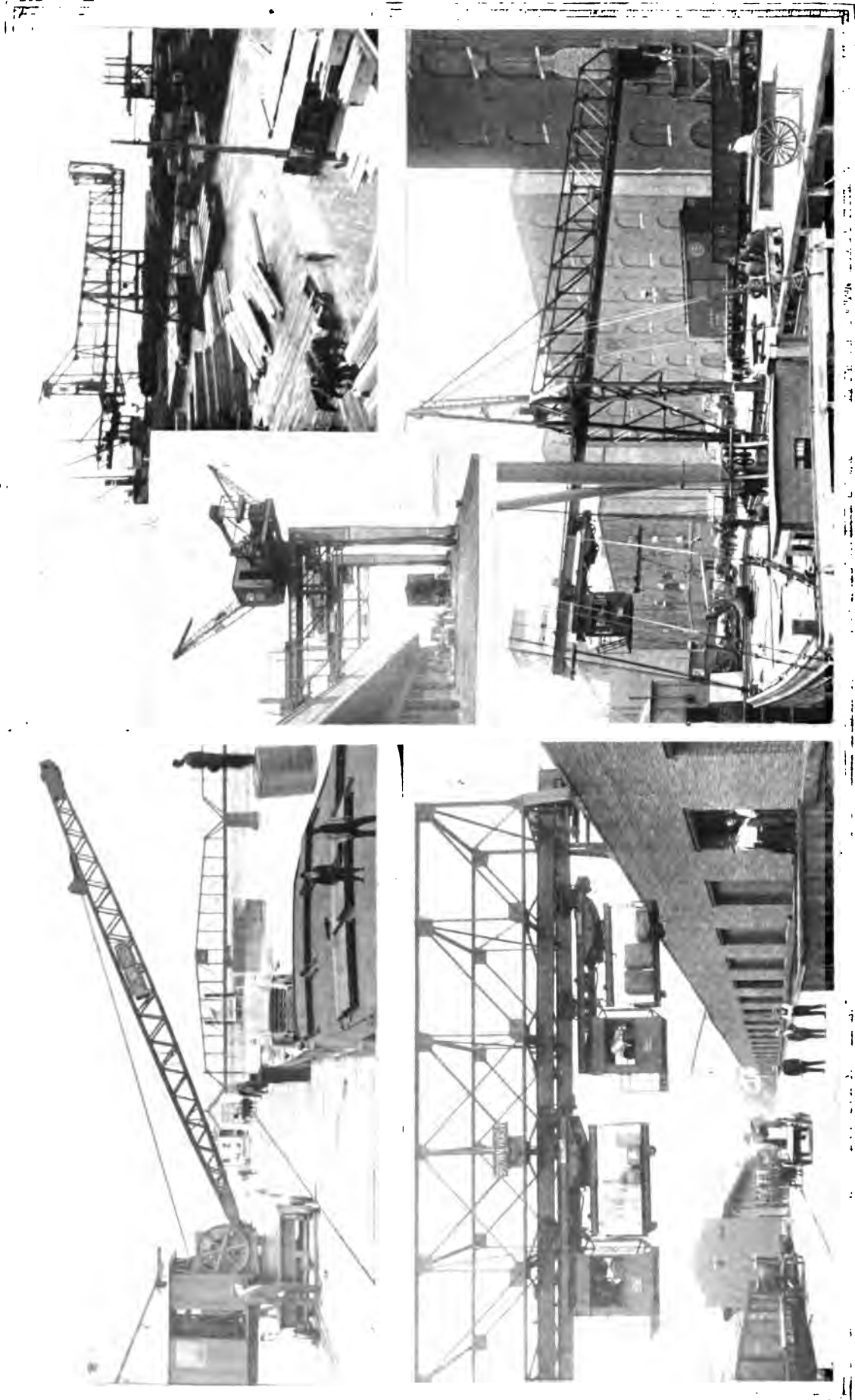
The New York Dock Company owns and operates 150 bonded and free storage warehouses which have a total capacity of approximately 55,000,000 cubic feet, or, roughly, 1,400,000 tons of merchandise. They also own twenty manufacturing buildings with a total rental area of 1,134,000 square feet. In addition to these facilities there are extensive cold storage plants and three distinct terminals connecting up with most of the large railroad systems centering at New York.

It is this great warehouse system which chiefly interests San Francisco, for the wharf system itself has nothing to offer in the way of improvements over the structures at present doing duty on our own water front. In this connection we will quote from the report of the special committee on Harbor Survey submitted to the board of directors of the San Francisco Chamber of Commerce on May 28, 1918, as follows:

"The committee is of the opinion the evidence shows that there is sufficient berthing and wharfage space for the present normal requirements of the port and that any congestion that has occurred was largely due: First, to the unwarranted use of the wharves for storage purposes; second, the shortage of cars for shipment; third, the embargo put on movement of cargo by the railroads; fourth, the shortage of ships."

The shortage of cars for shipment, the embargo by the railroads and the shortage of ships are matters that need not be dealt with here, as they are obstacles which can in no way be remedied by alterations in our water front. It will be noted that the one reason for congestion assigned that can be laid to the doors of our water front system is the use of wharves for storage purposes—or, in other words, the lack of an adequate warehouse system immediately adjacent to the water front.

In the small cuts shown herewith, it will be noted that the water front proper, with its wharves, is only separated from an extensive warehouse system by the usual marginal street. San Francisco is perhaps better supplied with marginal street facilities than most American seaports, since the Embarcadero is very wide and capable of taking care of all the traffic which it may be called upon in the future to bear. It is the warehouse system illustrated in these views which enables the rapid turnover of ships at the wharves, as it furnishes a highly important direct outlet for freight in addition to the railroad cars and drays. In short, the warehouse system acts as a reservoir for both incoming and outgoing freight and by absorbing



A group of installations of cargo handling machinery made by the Brown Hoisting Machinery Company, one of several concerns which make a specialty of freight handling problems. On the upper left is shown a locomotive crane loading freight on a barge from the quay wall; lower left, double monorail bridge transporting freight from docks across the marginal street to the warehouse, or vice-versa as desired; center, two 3,000-pound electric revolving traveling gantry cranes, their traveling bridges spanning the railroad tracks at the edge of the wharf; upper right, a traveling gantry in use on a Northwestern lumber wharf, the gantry proves a valuable aid in loading, sorting and distributing lumber products; and lower right, freight moving directly from barges into an adjoining warehouse



Marginal street flanked all along with five and six-story warehouse buildings

surplus on rush days helps to obviate the condition, often found on our wharves, of several days of feverish rush followed by a similar period of absolute stagnation.

In the page group of pictures shown herewith is illustrated some of the apparatus installed at American ports to aid in the handling of freight. One view illustrates a double monorail arrangement for the transference of warehouse hand trucks across the marginal street. These loaded hand trucks are picked up from the bulkhead wharf, transported overhead across the marginal street and deposited on a movable platform on a level with the warehouse floor, from whence they can be wheeled direct to their destination on the ground floor or onto the freight elevators inside the warehouse for storage on some upper floor.

Another view illustrates a pair of 3000-pound capacity revolving, travelling gantry cranes. These machines move along on tracks, their frame being of the bridge type to operate over the usual railroad tracks for freight cars. They unload or load direct from the vessel's hold onto railroad tracks or at the doors of the wharf shed, or vice versa.

A lumber handling gantry, located at one of our northwestern ports, is shown in another view. This machine has been found very useful as a labor-saver in loading, distributing, piling and sorting lumber



Cold storage facilities on the waterfront prove a valuable adjunct to any port

shipments. Its range of action can cover an entire wharf and as far inshore in line with the wharf as is desired, while the amount of wharf space lost owing to its use is practically negligible.

There is one point in connection with the installation of cargo handling machinery which is bound to receive more and more attention as the development of ports progresses and that is the effect that will be manifested on ships' tackle. It must be conceded that if a vessel is operating regularly between ports which are all provided with mechanical means for loading and unloading vessels, that the ship, as long as she is operating on that run, is carrying a great deal of unnecessary tackle. On the other hand, should she be sold, or her run changed, she would need the tackle, and therefore it must be provided. The saving which would be effected through doing away with carrying unnecessary weight back and forth would be considerable, and yet, since a ship cannot be built with the expectation of staying in one trade for the full span of her natural life, the idea of doing away



Part of the waterfront at a great American port showing the proximity of the warehouse system to the front

with cargo winches is, for years at least, decidedly Utopian.

The Islais Creek and India Basin Project.

That the California State Board of Harbor Commissioners and their chief engineer are fully alive to the importance of a warehouse system, the advantages of the bulkhead wharf and rapid increase in the average size of ocean-going freight carriers is evidenced by their latest move. According to the announcement of acting President John H. McCallum, berthing space will be provided at the outset for at least two 15,000 or 20,000-ton steamers. On the Islais Creek channel, which will be dredged to the required depth, there will be constructed from the Third street bridge eastward to the bay 3000 feet of bulkhead wharf.

In speaking of the projected improvements and extension of San Francisco's water front, Mr. McCallum said: "From the Third street bridge, which bisects the Islais Creek channel, to the Government pier head line, there will be length for at least two, possibly more, 20,000-ton freighters to berth at one time. The Harbor Board is taking cognizance of the probable increase in the size of ships to go into the trans-Pacific trade after the war, and will prepare in advance to accommodate them. This is



The coal barge with equipment for the rapid bunkering of vessels in the stream is not only a great convenience to steamers but also relieves the wharves of over crowding

only one of the phases of the port's development that is being rapidly worked out. Incidental to the wharf construction to be quickly developed will be the establishment at the Islais Creek terminal of extensive warehouse facilities along the channel landward of the main bulkhead wharf. Shipping men and other experts who have been examining the site express favorable opinions of it. There is no question of the adaptability of the location. For many classes of ship cargo it is ideal. It will bring within easy reach of the railroads through freight which will be transferred from the ship to the cars at the minimum of cost and time. This goes to the benefit of the ship in reducing the cost of operation as well as to the consignee. The outstanding phase yet to be worked out will be the linking up of the railroad systems with the ship facilities. The Southern Pacific, Western Pacific and Santa Fe Railroad systems are all readily accessible."

Thus we see that the first part of the long stretch of water front lying to the southward of the present highly improved front is being seriously studied

out in the true light of a freight terminal rather than as merely a site on which to build more wharves. The opportunity for creating a real marine freight terminal on India Basin and Islais Creek cannot be seriously questioned. Basins located on San Francisco Bay are apt to silt up rather quickly and require occasional dredging, but this does not entail enough expense to be considered a serious drawback. We predict that if a properly co-ordinated wharf, warehouse and rail terminal system is installed at Islais Creek that these new harbor works will be fully utilized and that the project will prove an unqualified success.

For the use of pictures showing handling equipment used in this article, we are indebted to the courtesy of the Brown Hoisting Machinery Company and the views are all of actual installations made by that concern in this country. In future articles we will illustrate handling equipment suitable for harbor work manufactured by other firms which make a specialty of such machinery.



Coal wharves present a problem which can readily be solved since but one commodity is handled and machinery can be devised to exactly meet the requirements of economical coal handling

Backing American Ships With American Dollars

By Edward N. Hurley
Chairman United States Shipping Board

THE United States is the greatest coffee consuming nation in the world.

We buy every year from Brazil about \$100,000,000 worth of coffee. Potentially, that should be the greatest influence for sales of our own products to Brazil. Actually this coffee consumption has yielded to the United States only a fraction of its potential benefits.

European shipping concerns have controlled practically all shipments from Rio de Janeiro and Santos to New York and New Orleans. About two-thirds of the coffee comes to New York and one-third to New Orleans. An average of three ships a month were required in normal times to carry to New Orleans the 2,000,000 bags for the South and Middle West. In a well-balanced trade, these ships would have been available for return cargoes of American products.

The Middle West, especially, might have been in an advantageous position, because it could command lower railroad rates to New Orleans than New York. But the ships of this coffee fleet, all under foreign flags, made no effort to secure return cargoes. After discharging coffee, they loaded with cotton and other raw materials for European manufacturers. They steamed away to Europe, took on cargoes of manufactured goods made largely from American raw materials, and carried these back to Brazil.

Lacking ships to South America and banks on that continent our coffee importers had to pay exchange and commission to European banks. The foreign ships upon which we depended provided a smooth highway for Brazilian coffee into New Orleans, greased the way for American raw materials to reach European mills, and carried European goods to Brazil, where they were paid for with the Brazilians' profits on sales of coffee to the United States. These foreign ships were so routed that they rendered their first service to the European exporter, their second service to the Brazilian coffee grower—and we came in for service after that.

Our foreign trade has been full of opportunities like this. But, lacking American merchant ships and American banking facilities in other countries, we have let the foreigner improve the opportunities.

Now we are building a real merchant marine. American banks are establishing foreign branches. ✓ The American ship and the American dollar are going to work together, and the more attention we pay to this great field of business the harder they will work for us.

Shipbuilding for war purposes has made a tremendous appeal to the American imagination. We must now put our merchant marine into the Nation's thought in just the same way. These are the ✓ Nation's ships. They will increase prosperity for people in the corn belt even more than those on the seaboard. They will serve the farmer and consumer even more than the manufacturer and exporter. When we get the American merchant marine into the daily thought of every producer,

and our boys and girls play with shipping toys, and American youth consider the sea in choosing a career, then we shall have something upon which to build foreign trade, foreign exchange, foreign investment.

War has made us a real creditor Nation. We have bought back from European investors billions of dollars worth of American securities. We now own our own railroads and factories, and hold the bonds issued by our State, county, and municipal governments. We have lent billions of dollars to the Allies, and will lend them billions more before the war ends. We have opened book accounts with nations not actively engaged in the war who want to buy goods on credit from us. Best of all, we have begun to learn new habits of thrift and investment through buying Liberty Bonds, so that peace ought to find us with the mortgage of foreign investments on this country paid off and money in pocket to lend other nations.

The world owes us a great deal of money. But our principal debtors are the great manufacturing and exporting nations, like England, France and Italy. Naturally, they will pay their debts in goods as far as possible, and much of the trade which grows out of these obligations will take the form of shipments of American raw materials to make the goods with which they will pay us. Necessity will also lead them to be active sellers of manufactured goods in South America, the British colonies, and the Orient, and in that trade there will never be either American competition or jealousy over business that properly belongs to them, because we realize the enormous sacrifices they have made for humanity, and wish to see them return to peaceful prosperity as fast as possible.

But there is trade to be built on new shipping routes between this and other countries. More ✓ than that, there is service to be rendered other countries by our ships and money.

Let us take Brazil as an illustration. When American ships go to Rio and Santos for coffee, they will carry American officers and seamen. There are no better salesmen or creators of good will in the world than the men who man merchant ships running on regular lines from one country to the other. For their employment depends largely upon freight traffic. With our coffee, brought to us in American ships, and paid for in American manufactures sent back to Brazil, our officers and sailors will work like those of other nations to get freight.

With our manufacturers making payments in goods to Brazil, there will be a direct money exchange between Rio and New York, Santos and New Orleans, instead of the old triangular payment of money by American coffee importers to Brazil through European banks. So American dollars will be working with American seamen to safeguard the trade that belongs to us.

What sort of manufactured goods will our ships carry back to Brazil?

Some of the stuff will be for consumption, such

as textiles, shoes, hats, millinery, agricultural implements, office equipment, household furniture. But Brazil needs production and public service equipment as well. The Balkan war diverted European capital from her industries and communities. The world war has put her on still shorter allowances. Her prosperity thus far has rested on two products—coffee and rubber. The development of rubber plantations in the East Indies has decreased her sales of crude rubber and awakened her to the necessity of wider agricultural development—cattle raising, grain growing, and the like. This calls for investments in agricultural enterprises, the settlement of new lands, the building of new railroads, the financing of new communities. Brazil also possesses vast undeveloped water power, and is endeavoring to establish manufacturing industries. She will need a market for her bonds and stocks and if the American dollar helps her create the basis of prosperity, it will be followed by American electrical machinery, railroad equipment, and other apparatus, thus creating freight for the return voyages of American merchant ships operating regularly in the Brazilian coffee and passenger trade.

Ships are the keystone of this whole elaborate structure.

Our trade abroad has grown haphazard, like Topsy, and become lopsided in many ways. It has been unbalanced financially, so that our profits have gone to pay foreign shipping companies, bankers, and insurance brokers. It has been unbalanced in tonnage, so that while we bought products of other nations and should have been building trade with them in finished goods, we have merely supplied raw materials for other manufacturing nations. We have been set aside on one leg of the triangular voyage when we should have been doing business direct, give and take, as we do it at home—you deal with me and I deal with you. Our foreign trade has grown against every handicap simply because of excellent American products which overcame competition on merit.

Ships are the rallying point round which we must pull all this business together, and now is the time for every American to begin studying our merchant ships and all that goes with them in the way of ocean delivery service, foreign exchange and investments, sales of American products for the out voyage, and purchases of raw materials for the return trip. We will shortly have the ships. It is time to acquire the knowledge of ships which will enable us to utilize our new merchant fleet for the service of this and other nations.

The Diesel Engine and the Surface Ignition Engine

By Philip Lane Scott

THE heavy oil-burning engines are divided into two main classes—the true Diesel and the surface ignition types. The latter class often goes under the name of "semi-Diesel", but this word is neither accurate nor descriptive, while surface ignition is both.

The history of the invention and early development of the Diesel engine is fairly well known, but the scientific and technical considerations leading to this invention are not often discussed, and, because they are of great interest and have a direct bearing on the comparison of the two types of heavy oil engines, I venture to review them.

Dr. Rudolf Diesel, a Bavarian engineer, was absorbed in the idea of producing a heat engine which should operate on the Carnot cycle, the most efficient thermal cycle known. This cycle consists of an adiabatic compression (no transfer of heat to or from the working fluid), an isothermal addition of heat (addition of energy at constant temperature), an adiabatic expansion and an isothermal subtraction of heat. All heat engines operate between two heat "planes", the temperature of addition of heat energy (combustion) and the temperature of loss of heat energy (exhaust). The interval between these "planes" and the method of attaining them determines the thermal efficiency of the engine. The combination of processes mentioned, called the Carnot cycle, is the most efficient; and Dr. Diesel believed it could be attained by compressing air in a cylinder to a point where its temperature would be sufficient to ignite a hydrocarbon fuel. The fuel was to be introduced in such a way

that the combustion would take place over an appreciable length of the piston travel. It was thus hoped to obtain an approximation to constant temperature addition of heat, the tendency for a rise in temperature due to combustion being compensated for by the simultaneous expansion of the gases. He intended to use powdered coal as a fuel, and, since the coal would burn before the desired moment if introduced at the beginning of the compression stroke, due to the rapid rise in temperature, he sought to inject his fuel at the end of compression, using air only as a working fluid during the first part of the cycle.

In 1893 his first engine was built and placed on the test block. It was turned over by power and so successful was the idea that the fuel not only burned, but exploded, breaking the engine and nearly killing the inventor. He immediately built another engine, and it was not long before success seemed fairly assured, but operation on the Carnot cycle had not been obtained. Instead, the so-called constant-pressure cycle represented the energy flow. This cycle consists of an adiabatic compression, a constant pressure combustion (instead of constant temperature), an adiabatic expansion and a constant volume of heat (instead of constant temperature). This constant pressure cycle is the distinguishing feature of the Diesel engine. The combustion takes place during an appreciable length of piston travel and at such a rate that the pressure neither rises nor falls, although the temperature rises.

The surface ignition engine operates in an en-

tirely different way as far as the thermal cycle is concerned. The same cycle as that for gasoline and gas motors is used. They are properly termed explosion motors in contradistinction to combustion motors. The cycle is called the Otto or "constant volume" cycle. The name constant volume indicates that the energy is added at constant cylinder volume or during no motion of the piston. The cycle consists of an adiabatic compression, a constant volume addition of heat (explosion), an adiabatic expansion and a constant volume of loss of heat.

A simple point of distinction between the two cycles is in a comparison of the relation of the compression pressure to the combustion pressure. In the constant pressure cycle the combustion pressure is about the same as the compression pressure, while in the constant volume cycle the combustion pressures are from two to three and a half times the compression pressures.

These technical considerations are of practical value, as follows: Just as the constant pressure cycle is less efficient than the Carnot cycle, so is the constant volume cycle less efficient, thermally, than the constant pressure cycle, because of the nature of the periods in the cycle. The thermal efficiencies in each cycle depend on the distance between the temperature planes and on the work consumed in compression and given up in expansion (the means of approaching the two planes). It is possible with the constant pressure cycle to use a higher compression, securing a higher average temperature plane during combustion and a larger expansion ratio than is possible with the constant volume cycle. This for a mechanical reason. If the constant volume cycle in which the fuel burns explosively were to have as high a compression as is customary in Diesel practice, say 500 pounds per square inch, then the explosion pressure would reach at least 1000 pounds per square inch, and the cylinder, shaft and bearings would have to be designed to carry this instantaneous but very extreme load. In the constant pressure cycle the cylinder, shaft and bearings are required to stand a pressure only slightly higher than the compression pressure. Therefore the compressions in surface ignition engines run from 125 pounds per square inch to 250 pounds per square inch, but in Diesel engines from 450 pounds per square inch to 700 pounds per square inch. It is a fact commonly known that the higher the compression in an internal combustion motor the more efficient the operation.

This gives the Diesel engine a clear thermal advantage. Its practical value lies in the fact that it indicates the direction of development. At present this advantage is not great in many cases, particularly in small powers and the surface ignition engine has features which make it better suited for many purposes.

To get operation on the constant pressure cycle careful regulation of the injection of the oil is necessary. It is not a question of squirting the required amount into the cylinder, but of admitting continually varying amounts during equal successive time intervals of the injection period and also of beginning and ending the injection at accurately predetermined points. Since the time during which

the oil is injected (from 30 to 40 degrees on the crank circle) is from 1-18 to 1-80 of a second, accurate construction is demanded. In the surface ignition engine this matter is not so important. The time of beginning the injection must be pretty carefully determined, but after that point is reached the fuel should be shot in about as rapidly as possible. This means that the oil-injecting mechanism is not so delicate in the surface ignition engine as in the Diesel. Further, and far more important, it has so far been found impossible to atomize the oil sufficiently by direct injection to secure combustion in heated air alone, which is the case of the Diesel engine. Therefore, compressed air is necessary to aid in the fuel injection for the latter type. The air compressor must deliver air at a pressure 50 per cent higher than in the cylinder—that is, from 800 pounds per square inch to 1500 pounds per square inch. The air compressor is one of the most prolific sources of trouble in the Diesel engine because of the high pressures and high speeds. There are now several compressors which are perfectly reliable, but it has been a slow development.

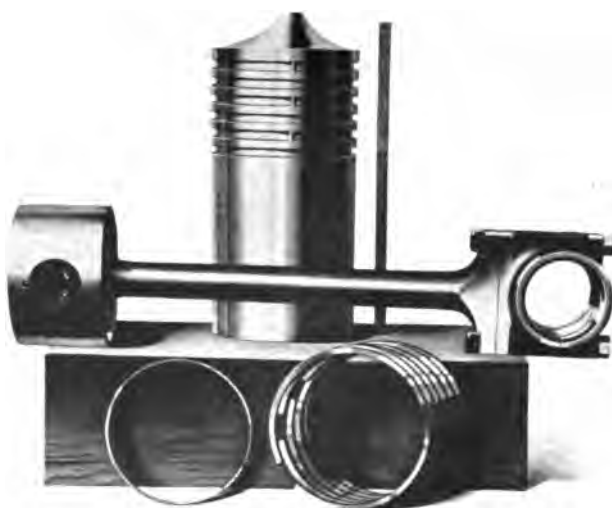
The smaller sizes of surface ignition engines can inject the fuel directly with success. There is, however, an appreciable loss in the efficiency of combustion. A good Diesel engine develops a brake horsepower on about 0.4 pounds of oil, while a surface ignition engine requires from 0.45 to 0.55 pounds with direct injection. The larger sizes of surface ignition engines, however, do not escape this trouble and must have compressed air injection. This is due to the difficulty, even with air, of atomizing the fuel properly with large cylinder diameters.

Water has sometimes been used with success to aid in the proper burning of the fuel. This presents an interesting, but not a new idea, having already been applied to kerosene engines. One foreign firm used water with the oil for some time, but has now returned to air, finding that water is difficult to regulate, requires an extra pump and causes rapid erosion of the cylinders. Apparently water has a catalytic action on the oil vapors.

It can then be said that the surface ignition engine presents the advantages of lack of an air compressor, but only in small sizes, of being more rugged and reliable, particularly with unskilled attendance, and usually of being cheaper. It has the disadvantages of consuming more fuel, sometimes a great deal more, than the Diesel engine and of being confined to small and medium powers. About the largest horsepower obtained to date is commercial work is 125 horsepower per cylinder. The Diesel stands alone for large powers.

For small powers, 50 to 500 horsepower, where strict fuel economy is not essential and experienced labor unavailable, the surface ignition engine is better. But for large powers, 500 to 10,000 horsepower, the Diesel engine is unquestionably the only choice and above 1000 horsepower the only type available.

There is now some revolutionary work under way with surface ignition engines, which may change the earlier reports. Only a single cylinder engine has been built so far, but it holds very great promise.



End view, piston assembly and cylinder casting for the new Weiss engine



The New Weiss Engine

By Rex W. Wadman

MR. CARL W. WEISS, who for many years was associated with the Mietz and Weiss Engine Company, and who is now connected with the Weiss Engine Company of Chicago, Ill., is credited with having in 1894 designed, built and patented one of the first practical surface-ignition, medium compression, two-cycle oil engines produced in this country, and since that time Mr. Weiss has been designing and building this same type of engine, gradually refining his design, perfecting details and widening the scope of the heavy oil motor.

His latest developments have been incorporated in the new series Weiss engines, now coming through production. The engine, illustrated herewith, is a 400 brake horsepower, four-cylinder engine, the same type being built in four, six or eight cylinders. The engine is one of the two cycle, single action type, two-cycle, embodying the new Weiss method of scavenging.

In the ordinary type of surface ignition, medium compression oil engines, a baffle plate piston is normally used in conjunction with crank case compression for scavenging. The baffle plate piston, by its very construction, led to uneven thicknesses of metal, which in turn led to uneven contraction and expansion and frequently resulted in cracked piston heads. Mr. Weiss experienced this trouble, as have all designers of heavy oil engines, and has experimented extensively in an effort to do away with this rather serious defect.

By referring to the accompanying illustrations, it will be seen that the piston in this new engine is conical, which is a rather radical departure from accepted designs. A little later it will be explained how this conical piston operates in conjunction with the new scavenging method.

Referring again to the drawings of the four-cylinder engine, there is a crank case cast in one piece to which the cylinders are bolted. There are five

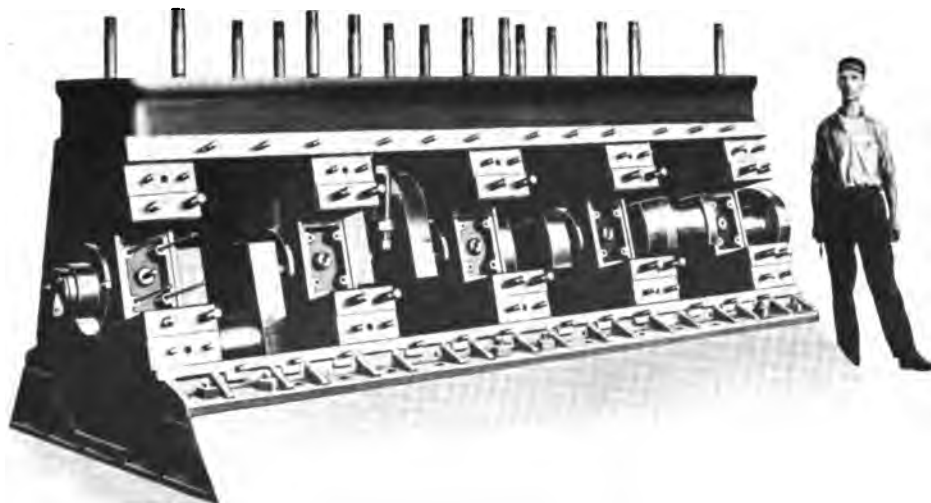
bearings with regular bearing caps for access to the bearing bushings, and the removal of the crank shaft sidewise, which can be done without interfering with any of the piping or fittings attached to the engine, and requiring much less room than is necessary for engines in which the shaft can only be taken out lengthwise, or in others where the entire upper engine—that is, all the cylinders complete with upper part of the crank case—must be raised. The air suction valve in this size is attached to the crank case cover.

The bone of contention regarding the relative efficiency of the surface-ignition, medium-compression, two-cycle oil engine (it is now generally accepted that an efficient descriptive term for this style of engine is "Weiss-type", in view of Mr. Weiss' undisputed originality in designing this style of engine, consequently in the balance of this article the term "Weiss-type" will be used to signify the surface-ignition, medium-compression, two-cycle oil engine) has been scavenging, it being contended that previous types of this style have not completely burned the charge or completely cleared the cylinder of burned gases after each explosion. In this new engine Mr. Weiss has incorporated an entirely new method of scavenging. There are three annular sets of piston control parts—(1) the exhaust, (2) the supplementary, and (3) the crank case port. The supplementary ports are open to either atmospheric or under low pressure of air supplied (as in this instance, see illustration) by a small pressure blower. As the piston uncovers the first series—the exhaust ports—near the end of the expansion stroke, the pressure in the cylinder drops to atmosphere, and due to the abrupt discharge and the forcible cooling of the gases, the pressure at once goes down to several points below atmosphere. At this point the supplementary ports open, allowing a charge of pure air to sweep in radially over the conical piston head, displacing the ex-

haust gases left in the cylinders. Almost immediately following this as the crank moves through the lower dead center, the crank case air under approximately five pounds pressure per square inch, also flows in over the conical piston heads by way of the annular series of ports formed by the spirally ribbed lower parts of the cylinder liner. In this way three completely separate and distinct charges of air are introduced into the cylinder during the scavenging process, which, undoubtedly, accounts for the remarkable fuel efficiency of this new Weiss type engine, and its ability to operate indefinitely without undue heating of piston head.

The oil injection system of this multi-cylinder engine is reduced to the utmost simplicity. In place of direct driven governor control injection pumps, there is an independent duplex pump to keep the oil under constant high pressure and a compensating distributor valve driven from the engine shaft, arranged for timing adjustment for different grades of oil and either direction of rotation. This pump is connected to the air receiver used for starting and reversing the engine. With a normal air pressure of 200 pounds in the receiver, the oil pressure is kept at 1000 pounds by a reducing valve in the air line. Heavy oils require high pressures for efficient spraying. The governor is designed to act directly on the compensating valve, and is in fact carried by the distributor valve and submerged.

There is a spiral gear mounted on the front end of the crank shaft which drives the oil distributor on one side and the air distributor for starting and reversing on the other. Each cylinder has an air check valve piped to the air distributor and a relief valve open to the atmosphere. These



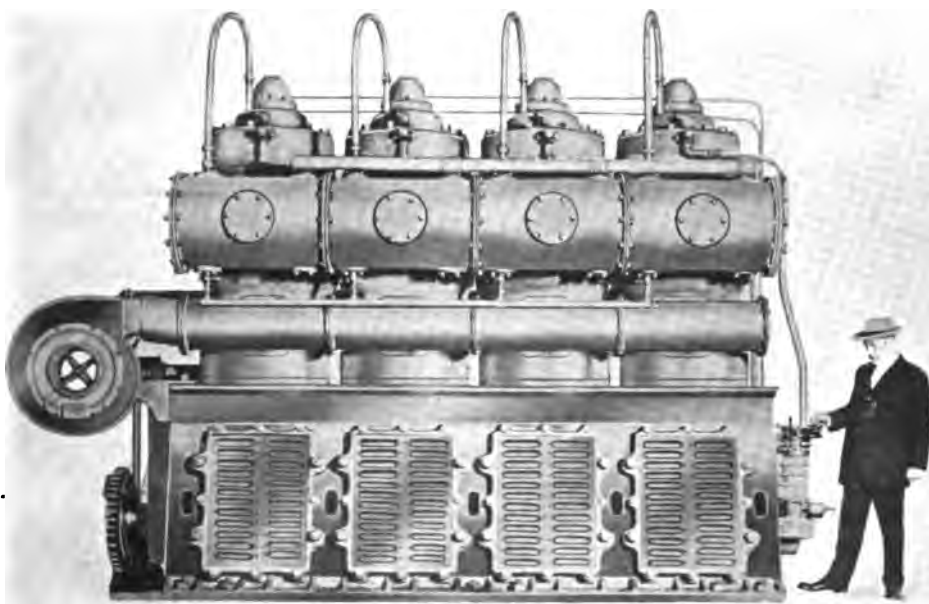
The crank case of the new Weiss engine shown with covers removed

relief valves can be operated either independently or simultaneously by a lever at the front end of the engine, so that the entire control of speed, starting and reversing and pressure relief is brought within easy access of the engineer.

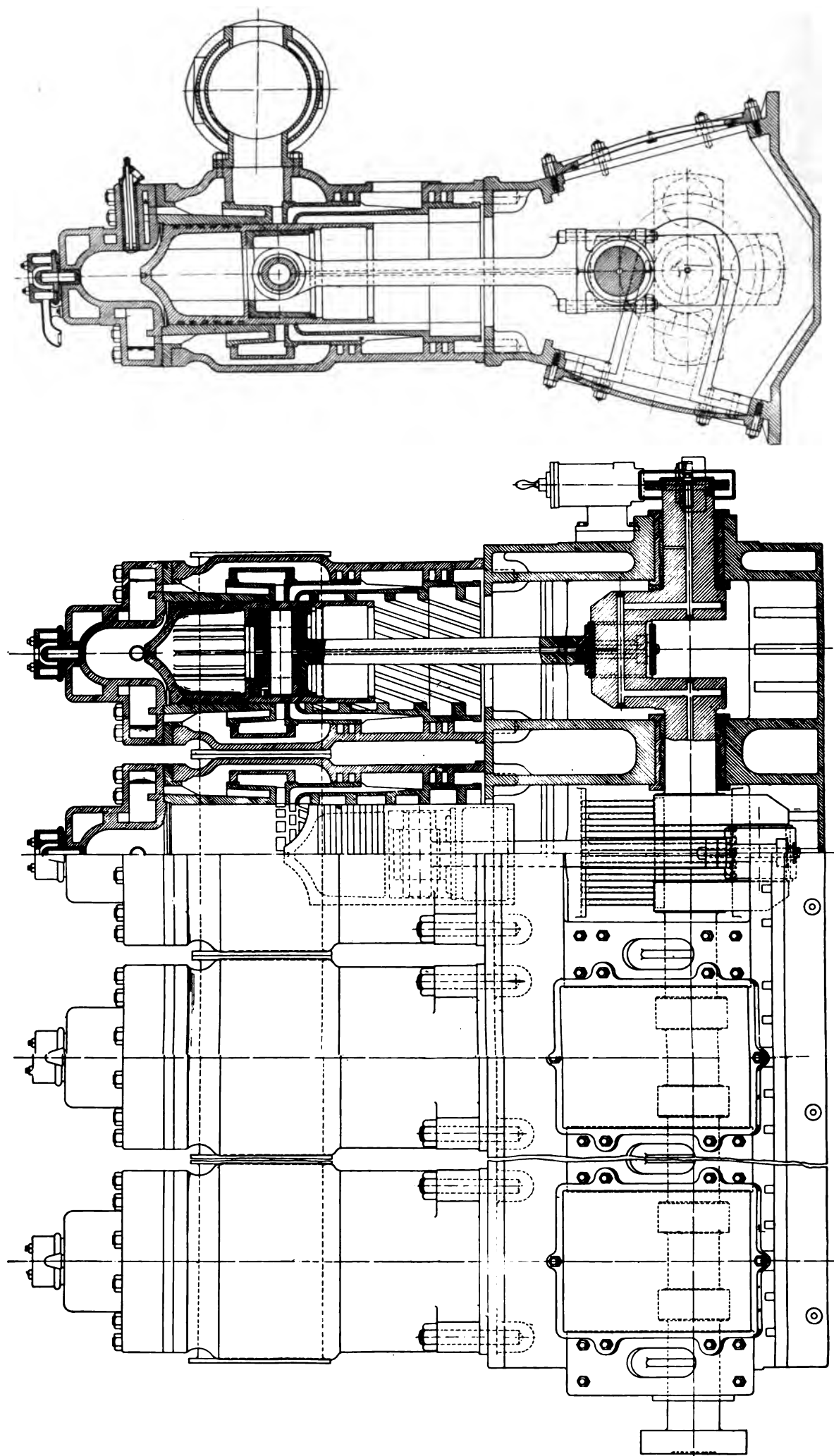
Forced feed lubrication is used for the cylinder, main bearings, crank pin and wrist pin, each pipe terminal fitted with a lubricating sight check. These lubricators are of the single plunger, distributor disk type, furnished by L. T. Weiss of Brooklyn and used in large quantities by the United States Government on single and multi-cylinder engines and guaranteed to force oil against 200 pounds pressure. The illustration shows an eight feed circle mechanism. A hardened steel worm engages a worm wheel disk, which latter carries a steel plunger with its operating yoke. As the checks turn, the two diametrically opposite projections of the yoke and the fixed star wheel operate as an escapement, reciprocating the plunger, to draw in and discharge oil through a hole in the disk, registering alternately with the suction and discharge hole in the base. Each discharge has a screw coupling for copper tubing. The whole mechanism being very simple and substantial, submerged in oil, with an extremely slow movement,

these lubricators run for many years without the least wear or adjustment.

The Weiss direct reversible marine engine requires no fly wheel and no special scavenging pumps. The weight per h.p. is reduced to approximately 150 pounds without sacrificing a reliable factor of safety within the limits of working pressure. At a pressure of 500 lbs. per square inch, the maximum main bearing pressure does not exceed 500 pounds per square inch projected area. The shaft in the 16½x22 unit is 8¼ inches in diameter. The bearing length is in ¾ inches. There is a centre bearing between each cylinder



The Weiss engine, four cylinder, erected and ready for operation



End elevation through cylinder and longitudinal elevation of new Weiss engine of the four-cylinder, four hundred brake horse power type, showing conical piston top and spiral grooves for imparting a
whirling motion to the scavenging air

pumps. The weight per h.p. is reduced to approximately 150 lbs. without sacrificing a reliable factor of safety within the limits of working pressure. At a pressure of 500 lbs. per square inch, the maximum main bearing pressure does not exceed 509 pounds per square inch projected area. The shaft in the $16\frac{1}{2} \times 22$ unit is $8\frac{1}{4}$ inches in diameter. The bearing length is $12\frac{3}{4}$ inches. There is a centre bearing between each cylinder in the multi-cylinder type. The bearing pressure, therefore, is $500 \times 214 = 107,000$ divided by $210 = 509$ lbs., as stated above, while the mean pressure is below 100 lbs. per square inch projected area. The mean crank pin pressure equals 290 lbs. per inch projected area. The connecting rod being 5 crank lengths, the side thrust at crank circle tangent is below 40 lbs. per square inch projected area. The piston is $16\frac{1}{2}$ inches diameter, and 33 inches in length, giving a projected area of $33 \times 16\frac{1}{2} = 544$ square inches. The mean wrist pin pressure averages 475 lbs. per inch. The size of the wrist pin is $5\frac{1}{2} \times 8\frac{1}{4} = 45.37$ square inches projected area.

Referring back again to lubrication, which undoubtedly is one of the most important features of any engine of the Weiss-type, it should be noticed that this engine uses a pressure system very similar to that adopted by high speed gasoline engines. The shaft is drilled all the way along the main bearings, crank checks and crank pins, with an outlet at each bearing and crank pin, so that with oil under pressure connected to the end of the crank shaft all the bearings are flooded with oil and the wrist pin receives its lubrication from the crank pin through a hole in the connecting rod, provided with a check rod running the entire length of the hollow connecting rod. When the engine is in operation this rod plays about one-eighth of an inch between the wrist pin and the crank box for the purpose of checking the oil which has once passed the rod, and retaining some for wrist pin lubrication. With this pressure system there is really no need for a special check rod for the oil in the connecting rod, but this provision is of considerable advantage inasmuch as there is no oil in the rod, when the engine has been standing for a sufficient time to enable the oil to leak out. With the oil in the rod, the wrist pin will get its lubrication right from the start, and this prevents any cutting of the bronze bushing which bears against the steel hardened and ground wrist pin. In the customary way of putting the wrist pin directly through the piston which is cast with heavy bosses on each side, the chances of conducting heat to the wrist pin are much greater than in the wrist pin carrier arrangement used in this engine. Particular emphasis is drawn to the illustration showing the conical piston with its even thickness of metal, to the connecting rod, to the piston pin carrier and to the piston pin, whereby it will be noted that the wrist pin is mounted in a separate carrier which is locked inside of the piston by means of a snap ring, thus dispensing with the ordinary piston construction calling for heavy bosses on the body of the piston and inasmuch as there is less heat conducted with the Weiss arrangement, the lubrication of the wrist pin and durability of it is materially increased. The heat flowing from the piston wall to the wrist pin in the old style engine necessarily makes the lubricating oil very thin,

and when the engine is shut down, the lubricating oil feeds ceasing, the pin becomes perfectly dry. When the engine is started later on there is a very good chance of trouble because it takes several minutes before the oil can reach the pin, but with the new Weiss method of wrist pin carrier, the temperature is lowered and with a check rod in the connecting rod the lubricating oil is kept at a level which will provide lubrication for the pin immediately the engine starts.

In referring again to the piston illustration, there is another feature in the new Weiss piston which is worthy of notice, and that is the absolutely uniform distribution of metal. It is impossible to maintain a true circular piston with the old method of wrist pin supporting bosses, and baffle wall projection, because the heat would immediately throw the piston out of round, and the constant distortion of the piston, due to temperature differences is apt to loosen the wrist pin in its bearing. To remove this contingency justifies the application of a cross head far more than the much exaggerated wear of the cylinder, due to the side pressure of the piston. In the new Weiss piston the wrist pin carrier is independent and there is no chance for the wrist pin to run against the wall of the cylinder, and any expansion of the piston shell, due to temperature differences, is perfectly uniform. Particularly is this uniform distribution of metal necessary at the head where the temperature is highest, and where the baffle plate in the old one-sided design sets up very great strains, frequently causing cracks in the piston head.

The 4-cycle method of operation was created because it was looked upon as the easiest and most direct mechanically for the compression type of engine. Its disadvantages were well known and it has never been accepted as final. It soon became very evident that for the large powers, particularly for marine propulsion, the 2-cycle method offered the best solution. Indeed, it has always been well known and has never been disputed that the mechanical side of the proposition is far more attractive in the 2-cycle type with piston control led ports. Whatever failures there may be on record in the development of the internal combustion engine in the large units for ship propulsion, the 4-cycle has at least an equal share. The main reason for 2-cycle failures is found in insufficient scavenging. The high volumetric efficiency of the scavenging idea, as used in the 4-cycle, was too quickly accepted and applied in an indirect manner to the 2-cycle engine. The movement of air currents in the cylinder during the scavenging period cannot possibly be followed along fixed lines of the designer's imagination, as he lays out an exhaust port on one side of the cylinder and a scavenging port on the opposite side and a baffle plate piston to direct the flow of incoming air, or when he used a valve in the cylinder head for the scavenging air inlet.

This valve in the head scavenging cannot be accepted as an improvement, either volumetric or mechanical, over the old baffle plate in spite of the fact that it is used in large units of recent design. The port arrangement in the Weiss engine is the logical step in the direction of securing high volumetric efficiency without sacrificing the advantages and simplicity of piston control led ports.

As the liner is independent of the water jacketed portion of the cylinder, its expansion axially is taken care of without any strain in the liner or the cylinder. The strain set up in cylinders cast integral with the jacket, due to temperature differences, has been the cause of many failures, especially in engines of the larger sizes. Cracks are frequently developing in the port section of the cylinder and jacket in sizes over 9 inch bore even before they leave the foundry.

The system of scavenging in the Weiss engine, supplying as it does a supplementary scavenging port for the purpose of supplying a greater volume of air than can be effected by the crank case compression method, still uses the crank case compression, however, for manipulating at low speeds at which the auxiliary air supply may be at only atmospheric pressure. The crank case gives a fixed and dependable volume at all speeds of the engine, which is used for starting and manipulating.

The volume of the auxiliary scavenging air is supplied by a centrifugal pressure blower driven from the engine shaft direct. There is, therefore, swept through the cylinder a volume of air equal to approximately twice the piston displacement. While it is true that the same high ratio of scavenging air to piston displacement can be had by low pressure piston air compressures, driven from some convenient reciprocating part of the engine through a walking beam, such as is employed in large 2-cycle Diesel engines, it should not be overlooked that the complications are very much greater involving as it does a complete scavenging

engine of 100% greater displacement than the main engine.

With the engine scavenging pump we are getting further away from the solution of the problem. The 2-cycle simplicity cannot be saved by loading it down with the complications of 2-cycle scavenging pumps, or step pistons. The single engine with two revolutions to one effective stroke is mechanically a better proposition than two engines with only one effective stroke per revolution, which we really get with the separate piston pump scavenging idea. The centrifugal pressure blower cannot be duplicated by any other means for large volume, simplicity and reliability.

Not depending upon ignition by compression and on account of the high volumetric scavenging of the $16\frac{1}{2} \times 22$ inch cylinder at 245 r.p.m. the compression pressure of 200 lbs. per square inch is well within the practical temperature limit. $16\frac{1}{2} \times 22$ cylinder volume minus the port volume is $214 \times 19 \times 245$

—=576 cubic feet per minute and the
1728

combustion of .703 pounds of oil equals 14564 b.t.u. calorific value 18,600 b.t.u. per lb. This is approximately 30 b.t. u. per cubic feet of piston displacement. Assuming 80% net volume (allowing for increase volume due to somewhat higher initial temperature and 10% exhaust mixture in the charge) we have 37.5 b.t.u. per cubic foot and expansion ratio of 7. The temperature is therefore very low considering that as high as 60 b.t.u. per cubic foot are successfully used in large gas engines.

J. H. Rosseter's Farewell Address

ON August 28th, this being on the eve of his departure to take charge of the shipping problems confronting the United States Emergency Fleet Corporation and Shipping Board, Mr. J. H. Rosseter was tendered a banquet by the San Francisco Chamber of Commerce. Here, before some six hundred of the city's leading citizens, Mr. Rosseter delivered an address that is remarkable for its simplicity, clearness and grasp of the problems which will face the United States in the operation of a huge merchant fleet. Mr. Rosseter's remarks were, in part, as follows:

In defense of our rights, and to crush the evils of military rule and ruin, it was our responsibility to provide a bridge of ships. After a year of feverish effort and activity, with a result standing unparalleled in the records of industrial accomplishment, it was time to face the problem of what was to be done with out ships when peace would come. To this task Mr. Hurley set himself some months since, well realizing that to organize for activity of such properties would take much time and effort. However, it is doubtful if any man can realize or appreciate one-half of the difficulties and problems to be encountered.

You are all aware from the interesting statements of Chairman Hurley that by 1921 it is expected that the United States will have a mercantile fleet of 25,000,000 tons. In these days of great effort numbers pall on us, and it is difficult to grasp the meaning of 25,000,000 tons of shipping. In a

word, it means equal to all of the ships under the British flag prior to the outbreak of the war. It means, for successful management, we must organize in one way or another to carry on a business which the British operated or functioned through all of the great steamship organizations, well known to you, including the White Star, Cunard, Allen, Cape Castle, P. & O., British India, Royal Mail, China Mutual, Holt Line, and hundreds of others, too numerous to mention. In a word, a combination equal to all the big British shipping companies, the smaller companies and the individuals. And it must be remembered that this is a problem to be faced, as it were, over night, and by a people suddenly emerging from a very small sphere, in fact the smallest circle on the shipping horizon, to that of first magnitude, representing possibly one-half, surely more than one-third of the world's shipping. As against the many worldwide shipping companies of other nations expanding slowly throughout the years, we have to face this problem all at once, and for the essential personal element have to draw on only a handful of experienced Americans, who during the years before the war were interested in foreign trade. It requires the building up of an enormous organization of capable executives and men experienced in the various branches of the service, such as captains, deck officers and seamen; engineers and their assistants; and not forgetting such essential ele-



John H. Rosseter, newly appointed Director of Operations for the United States Shipping Board. Mr. Rosseter has long been recognized as one of the country's leading shipping men and an enthusiastic exponent of foreign trade



A typical oil tanker fitted with Westinghouse Floating Frame Reduction Gears

Floating Frame Reduction Gears

THE tremendous demand for ships has automatically placed the building of sailing craft in the background. This is true not only due to ship speed requirements, but also that the crew for handling a steam vessel can be trained in a shorter time than say for a fast clipper. Hence the great importance of the steamer. Above these considerations is the fact that efficient ship propelling machinery is now available and in every day use, of such a type that it may be considered epoch making in marine circles.

These days of fuel conservation and also cargo space demands makes imperative the use of every device that can replace a less efficient one, thus passes the reciprocating marine engine to give place to the steam turbine. The steam turbine has long ago proved its superiority over the famous Corliss engine for stationary and central station work, due to its high operation economies, and small space requirements per unit of output.

The application of Westinghouse steam turbines with reduction gears of the floating frame type for ship propulsion is well carried out in the machinery of the tank and cargo steamers built and building at the yards of the Chester Shipbuilding Company, Chester, Pa., and other shipbuilding plants on both the Atlantic and Pacific seaboards.

Geared turbine propelling machinery may be located in the stern of the vessel as has been found expedient in the case of oil tankers, or its location may be amidships, which is usual for cargo ships.

As a typical example, in the case of a tanker, take the "Malmanger" (submarine), which was a vessel with the principal dimensions:

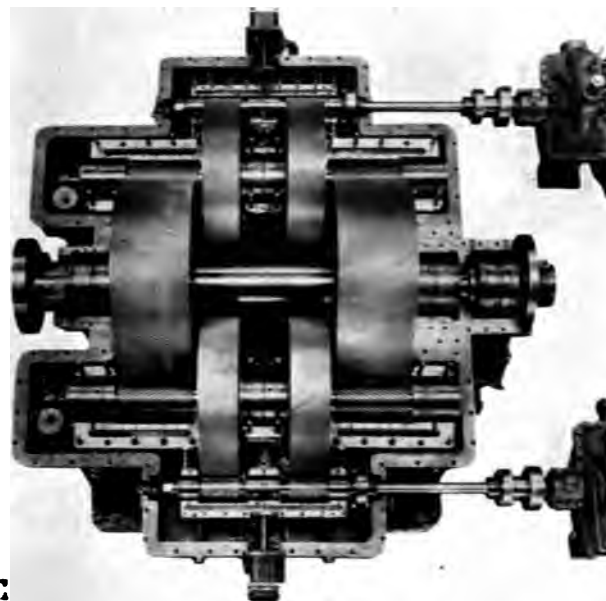
Length	401 feet
Beam	54 feet
Draft	25 ft. 9 inches
Displacement	12,650 tons
Cargo capacity	9,000 tons
Speed	10.5 knots

The boilers and propelling machinery are located aft and comprise three single-ended Scotch boilers, a Westinghouse cross-compound unit, consisting of a high pressure turbine and a low pressure turbine and two single-pinion first reduction gears, and one two-pinion second reduction gear. The arrangement is as follows: each turbine is coupled

to one of the first reduction gears, which in turn are coupled to the second reduction gear, this latter gear being directly connected to the propeller shaft. By means of this arrangement of double reduction gears, comparatively high speed turbines (3600 r.p.m.) are utilized for driving a slow speed propeller (70 r.p.m.). The propeller thrust bearing is of the Kingsbury marine type and located at the forward end of the second reduction gear. The lubrication of the main turbine bearings and the gear teeth and bearings is effected by a continuous supply of oil through a gravity system. Two oil pumps driven off the gear shafts, a cooler, strainer and storage tank, also comprise part of the oil system.

Floating Frame Reduction Gears.

The reduction gears are of the Westinghouse floating frame type. At the designed full power, the first or high-speed gears reduce speed from 3600 to 450 r.p.m. and transmit 1250 horsepower each. The second or low-speed gear reduces the speed from 450 to 70 r.p.m. Each pinion transmits 1250 horsepower. The total speed reduction from the turbine speed of 3600 r.p.m. to the propeller speed of 70 r.p.m. gives a ratio of 51.4 to 1.



The Westinghouse floating frame reduction gear shown with upper half of casing removed

The gears are completely enclosed in an oil-tight cast iron gear housing, and are of double helical type, the teeth being included at an angle of 30 degrees. The teeth are of involute form and are cut with the utmost precision to obtain reliable and quiet operation.

The pinions are of the three bearing type and are carried in a floating frame, which automatically maintains the alignment of the pinion and gear under all conditions of load, thereby producing uniform distribution of the pressure over the entire length of tooth face. Each pinion is driven by a flexible shaft which extends through it and is secured to the end remote from endwise. The flexible shaft allows the pinion to adjust itself without restriction to maintain its alignment with the gear wheel. The uniform distribution of pressure at all loads made possible by the use of the floating frame permits the use of higher pressures and smaller pinions and gears than is the practice with reduction gears of the fixed bearing type.

The flexible frames are of rugged construction to avoid deflection, and are supported by feet under the middle bearing, this support being amply flexible to permit the required movement in a vertical plant. The ends of the floating frame are held in the correct vertical plant by horizontal struts. The frames are divided and bolted together horizontally, a longitudinal channel for

supplying oil to the pinion bearings and teeth being formed in the joint.

The gear wheels are composed of a heavy forged steel shaft, a cast iron center and steel rims.

The gear and pinion bearings are composed of heavy cast iron bodies lined with genuine babbitt. The bearings are supplied with oil at a pressure of about 5 pounds per square inch which is introduced at the sides. No oil piping is contained in the gear housing. A trough which is supplied with oil from the channel in the floating frame distributes the oil to the teeth from above as shown. Oil is supplied to the teeth from below by sprays which are directed against the back of the pinion from the channel in the frame. The oil being carried around with the pinion and drawn into the meshing teeth.

One of the accompanying illustrations shows group of first and second reduction gears as applied to geared turbine equipments for ships having their engine rooms located aft. With this arrangement, the gears are placed forward of the turbines, and the intermediate shaft passes between the turbines, enabling the tail shaft to be drawn inboard for inspection without displacing any part of the turbines or reduction gears.

In the case of ships having engine room located amidships, the turbines are placed forward of the gears. The gearing for the two-speed reduction is contained in one housing.

Navy Crane Made Safe by Generative Braking

MANUFACTURERS are fast beginning to realize that American made goods are the best to be had, and also that they are built on integrity, and will not collapse like the German character has and the German floating cranes did for the Panama Canal. One wonders where the limits are to the immense work our Yankee shops are doing what would have been declared impossible two years ago. But nothing is impossible now. In the next breath, we find a great giant massive crane had been built that will lift a complete tugboat from its berth on the river or harbor bottom after sinking. A complete boat! This, too, seems nearly impossible. This "Made in America" crane is said to be the largest ever constructed in this country.



Two 60-horse power Westinghouse hoist motors driving hoist drums of crane

Floating cranes generally are of the bridge type and when operating, the whole crane including the pontoon is maneuvered to bring the hoisting cables to the proper position for lifting. Three other floating cranes have been built for the Navy, by the Wellman-Seaver-Morgan Company of Cleveland, Ohio, but none as large as this one. The new crane is of a different type, namely, the revolving, and it operates on the principle similar to that of the ordinary derrick.

To give a more concrete idea of the amount of work this apparatus can accomplish it may be said that its capacity is equivalent to the weight of 100 of the largest touring cars. The empty lifting hooks weigh about two tons, or the equivalent of a large touring car. When the jib is raised to its maximum height is over 200 feet above the water level, a height greater than that of an 18-story building. As previously stated the whole structure is mounted on a flatboat, or floating pontoon, and must not be endangered by handling these immense loads.

To proportion the parts of the crane, superior engineering skill was required. If the boat is tipped sidewise, it is still absolutely safe against turning over.

The boat contains a complete boiler plant, and an engine-driven generation which supplies the electric current for operating the various motions of the crane, which are controlled from a small house mounted high above the deck. By the means of a few levers and master controllers one operator is able to control all the functions with the utmost delicacy.



General view of the 150-ton revolving, pontoon crane, showing great outreach over the side of the pontoon

The speed can always be controlled by the means of the electrical mechanism of the crane. When heavy loads are lowered, the motors are turned into generators and thus the speed is controlled with great accuracy. In the case of an accidental interruption of electric current, all of the crane's motions are automatically locked by means of brakes, and so ensures the impossibility of dropping the load. Safety and accuracy are essential, as the crane is used to handle large guns and turrets on battleships, and if through carelessness or inaccuracy these should be damaged, it would mean a loss of hundreds of thousands of dollars.

The illustration (Figure 2) shows the first work which the crane did. The navy tug "Massasoit" was suddenly sunk in one of the harbors. After divers had passed the necessary cables under the tug, the crane rapidly and quickly lifted it to the surface, as shown. Westinghouse motors driving the hoisting drums are shown in Figure 3.

It might be interesting to add that the Panama Canal Commission purchased two similarly large cranes for heavy work. The cranes were purchased from a German corporation, but when the test load was applied (which was the same as applied to the crane shown in the illustration) it didn't pass muster. The first collapsed and was wrecked owing to a faulty design of structure.

The following data will give a good idea of the enormous size of this machine: Size of pontoon 140 feet long by 85 feet wide by 15 feet deep; size of engine generator set, 150 kw.; the crane has a main hoist consisting of two hooks of 75 tons, each, fixed on the jib; an auxiliary hoist of 25 tons capacity movable up and down on the boom; the crane rotates in a complete circle, the rotating being controlled by two 60 horsepower motors; the

boom luffs up and down from a practically vertical position to an angle of about 30 degrees from the horizontal in its lowest position; the luffing is accomplished by two 10-inch screws operated by two 60-horsepower motors; the main hoists can operate separately or simultaneously, as desired; when lifting the maximum load it is operated by two 60-horsepower Westinghouse type MC motors; the auxiliary hoist has separate motors for hoisting and trolleying, each of which is 60-horsepower Westinghouse; the counter-balance at the rear end of the crane is fixed, and amounts to 600,000 pounds; the total weight of the pontoon crane (displacement) is 5,000,000 pounds; the capstans are electrically driven, four in number, one at each corner of pontoon; the anchor hoists are steam driven, two in number, one at each end. The main pivotal bearing, or step bearing, supports a ball or universal joint and carries a maximum load of 2,021,000 pounds; the speed of the main hoist under maximum load is about six feet per minute; the speed of the rotation is one revolution in four minutes; speed of luffing boom, entire range, 12 minutes; the boom is of the cantilever type.

DOCK CONGESTION

Several of the largest docks at Tacoma have been taken over by the Government and are now being operated through the Quartermaster's Department. This action to an extent has added to the troubles of the outside shippers, who had been finding it difficult to obtain dock space. In connection with this the docks are now being operated under one head, with one man looking after the export and import freight business, and another the domestic business.

A Large Submarine Repair Job

ON April 18, 1918, the steam schooner "Phyllis," while under charter to the United States Shipping Board, stranded during a thick fog in the vicinity of Point Vicente, Cal. The vessel was on a voyage from Puget Sound via San Pedro to Atlantic Coast ports, loaded with lumber. Her owner, Mr. W. R. Chamberlin of San Francisco, who went to Los Angeles for the express purpose of attending to the final details of dispatching the vessel to the Atlantic ports, on hearing of the accident promptly arranged for the employment of the steam schooner "Wapama" to float and tow the "Phyllis" to San Pedro.

Little time was lost in getting a line from the "Wapama" to the "Phyllis," and by jettisoning the deckload of lumber with the rising tide, the vessel came off the rocks in the early morning of the following day.

As there were no facilities at San Pedro to make the necessary repairs, Captain Louis H. Turner, marine surveyor of the Fireman's Fund Insurance Company, undertook to put the vessel in such a condition that she could be towed to San Francisco. Under the direction of Captain Turner, patches made of lumber and canvas measuring 16x30 feet were fitted under water by divers Theodore Wick and Johnson. An area of some 3,500 feet of the vessel's bottom was covered in this manner.

The work proved long and tedious, taking some four weeks or more to do, but the efficiency of the patching was well demonstrated while the vessel was in tow of the tug "Hercules" on the trip to San Francisco. A heavy northeast gale, that registered 83 miles per hour at Point Reyes, was

encountered, but the engineers, with the aid of the pumps, had little difficulty in keeping the vessel comparatively free of water.

Upon the vessel being placed on dry dock, the magnitude of the work and the skill displayed in patching the vessel under water at once became apparent. In the opinion of the shipwrights in this locality, it was one of the largest and best jobs of submarine work which had come under their notice. Permanent repairs were effected by Mr. Foster, which cost, together with the salvage operations, something approximating \$85,000.

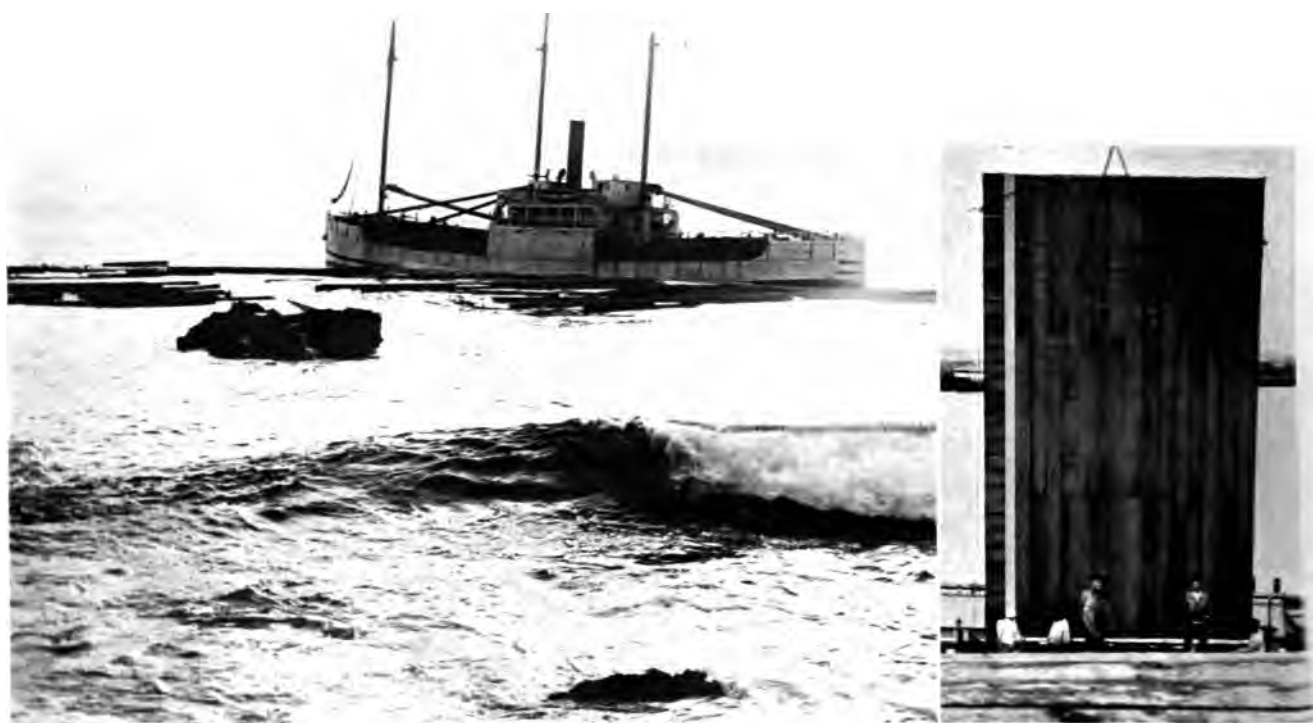
The vessel was insured with the Fireman's Fund Insurance Company.

Important Salvage

Through the courtesy of Mr. Dailey, San Francisco manager of the Overseas Shipping Company, we are enabled to show several views illustrative of the salving of the boilers of the San Francisco and Portland Steamship Company's steamer "Bear".

When the Bear went ashore on the northern California Coast it was many months before the possibilities of refloating this fine steamer were finally abandoned. Owing to the tremendous demand for engines and boilers for ships, there was immediate and widespread interest manifested in the salving of the power plant of this vessel, once when impossibility of floating her became fully apparent.

The boilers of the Bear were salved by the Portland Wrecking Company and the Mercer and Fraser Company contracted to move the boilers from the scene of the wreck to Eureka. The dis-



The steam schooner "Phyllis" stranded near Point Vicente, California, and one of the wood and canvas patches, 16 by 30 feet in size, with which temporary repairs were made on the vessel's bottom in order to let her proceed to San Francisco



The six salvaged boilers of the steamer "Bear" being transported across Humboldt Bay on a barge.

Freeman Art Co. Photo

tance the boilers had to be moved was thirty-five miles and when it is considered that there are no railroad facilities along this section of the coast the difficulty of the job at once becomes obvious. For a major portion of the way the boilers were rolled along the sandy beaches. In one instance it was necessary to cut a road through a cliff and several sloughs had to be crossed on barges. It took five months to move the boilers the thirty-

boilers weighs approximately forty-six tons, the difficulty of rolling them through thirty-five miles of beaches, rocky points and wildly wooded country can easily be appreciated.

Heavy improvements are still being carried on at the plant of the Told Drydock & Construction Corporation at Tacoma. One who saw these yards three months ago would not recognize them now



Shifting the boilers of the "Bear" along the beach by means of a cable and a donkey engine

five miles, a donkey boiler being employed to roll them along.

The Overseas Shipping Company recently dispatched a new American motorship to load these boilers for Shanghai, where they will be utilized on one or more of the steamers building at Chinese dockyards for the United States Shipping Board.

When it is considered that each of the "Bear's"

on account of the large amount of new structures that have been put up. The company has recently moved its old office building, located near the drydock, to the larger office building, just erected at the entrance to the yards on the land side. Here the company officials are quartered in most spacious rooms.



The "Bear" firmly imbedded in the sand on the Northern California coast. Several unsuccessful attempts were made to salvage the hull of this fine coasting steamer

The Port of San Francisco---Its Potential Possibilities

By F. W. Hall,
Commercial Manager Sprague Electric Works

TO attain to the full possibilities of this most important port so that it can retain its rightful heritage, one most essential thing is necessary and that is **speed**, speed of transference of freight between water and shore, between vessel and cars and also the speed of handling, that is, the assorting, distributing and tiering on the shore.

To secure this speed, there must be easy and free movements of the freight in every direction, no delays, no waitings and no confusion.

For speed there must be no points of congestion.

San Francisco, from the figures given lately in the various reports of the civic bodies of the city, has an excess of terminal capacity if the different piers are fully utilized.

Reference is made to these valuable statistics as indicating that much greater tonnage can be accommodated. The existing facilities are not fully worked.

This is due largely to the lack of speed in discharging and loading the vessels, and in the handling upon the shore, and speed is diminished, as is clearly shown by the ever-present but unnecessary congestion of the port.

This congestion is chiefly evident at certain points. One is at the point of deposition of the drafts from the ship on the side of the pier or quay, which place of deposition averages about 8 feet by 8 feet, or 64 square feet. This small area is easily congested by two or three drafts and is generally all the space that can be reached by the ship's winch or by a combination of ship and dock winches from one hatchway. This place of deposition can be increased by mechanical appliances as to enable so large an area to be served as to preclude at this place the possibility of congestion.

This is physically accomplished by the installation of quick acting traveling gantry jib cranes with an outreach and inreach of 55 feet serving without the crane moving, an area of 100 feet by 40 feet, or 4,000 square feet instead of 64 square feet. Not only is congestion at this area removed, but, as will be seen later, by this source of delay being eliminated the speed of discharging and loading can be doubled or trebled, especially if provision is made for quick handling on the pier.

By using two, or preferably four, ship's winches at each hatch, to drag the cargo from between decks to the hatchway and to above the level of the ship's upper deck, and there to burton the draft from the fall rope hook of the winch to the hook of the gantry crane, there is attained this trebling of speed or giving three (3) times the discharging capacity. This, however, is only possible by removing the cause of the past inevitable delay at this point of deposition on the side of the pier or quay.

The possible speed of only one or two ship's winches has been generally nullified at this congestion point at the waterside by the inevitable congestion. This delay is clearly evident where any of the ships are being discharged at the piers of the port.

By a combination of two ship's winches and two

gantry cranes per hatch, four drafts are kept moving at the same time and with four winches and two quick acting gantry cranes, six drafts are in the air at one time in connection with the one hatch. Three (3) cranes can be operated at one hatch.

Too often by the present methods, one draft only is moving at each hatch.

At five hatches it is possible that twenty to thirty drafts can be simultaneously moving, which would be from four to six times the usual number.

Ten to twenty winches and ten traveling gantry jib cranes (a possible thirty machines operating at one ship) would send a deluge of freight upon the pier and quay.

As this great cubical volume or tonnage must be assorted and distributed anywhere in the shed or in the open according to marks or cross marks and then tiered, it is certain that if the freight be not moved from even five thousand square feet without any delay, that the floor space will soon be so congested as to limit the transferring capacity of the winches and cranes. This lack of floor space for the freight movements to and from the piles has been plainly proved in the past where the two-wheeled hand truck has been employed. To reduce the ship's delay to the minimum, hand truck men have been added and then more men added until for them to move, little space was left for piling the freight. In one case out of thousands of square feet, only about one-fourth the area was left for freight storing. The greatest economy in space for hand trucking was observed, the travel of the men being rigidly kept in regular loops.

This is with the usual slow method of the past in the discharge of the ships.

The same principles apply in the loading of the ship as in the discharging.

It requires no argument to prove that with the full winch capacity of the ship in combination with the gantry cranes that any pier or quay floor of reasonable size would soon be so congested as to cause delay and there would be the greatest confusion.

The floor must be relieved of too great a volume of deposited or moving freight, and this is only possible by utilizing unoccupied air spaces for the freight movements, by machinery and tiering at least fifteen feet in height instead of the usual five feet in height. Every foot of floor space is of the greatest value and it must be kept for its legitimate use.

This transit shed is not a warehouse for long storage, but only for forty-eight hours holding. A shed should not be occupied in its floor area with columns, elevators, chutes and other incumbrances often used with two-story sheds, which, while essential in long storage warehouses, should not be permitted in necessarily limited waterfront areas. Warehouses are generally set back from the waterfront.

Overhead air spaces can be utilized by means of mechanical appliances, so as to relieve any possible floor congestion, having freedom for all movements

in the overhead space. The following are the conditions upon which such machinery is installed.

It must occupy no floor space in its position or in its operation. By it every square foot of floor and every cubic foot of space must be served by this machinery without any rehandling and saving all possible man power. In its operation there must be a continual succession of rapid movements and it must be able to move at once all freight as it comes from the ship.

Such machinery consists of only two side tracks the same as the usual traveling shop crane; there are generally two cross girders per crane, corresponding to the cross girders of the shop crane but often with only one cross track instead of two, for each bridge. The combination of the two fixed side tracks and the movable cross tracks form an adjustable loop.

On these fixed side tracks and the movable cross tracks, travel trains of one tractor and, at full capacity, four trailer hoists each of two tons capacity. Each train in its travel and hoisting is operated by one man, who can thus lift and convey eight tons and deposit and tier anywhere. Generally each hoist lifts, conveys and deposits one mark only, anywhere above one square foot of floor, and in addition the operator moves the traveling crane bridges, operating them from his cab.

By girders, the trains can pass at any point of the side tracks to or from the movable cross tracks, thereby being able to serve every foot of floor space. The overhead tracks, the traveling bridge and the trains of the tractors and trailer hoists combine all the advantages of the space serving cross traveling shop cranes with the flexibility of the monorail hoists.

As an example of excessive duty, the following will serve to indicate how the overhead adjustable loop system will fulfil all exacting conditions to prevent any possible congestion.

There can be taken as an example, a pier 900 feet in length and with two ships each 600 feet long discharging on each side of this pier.

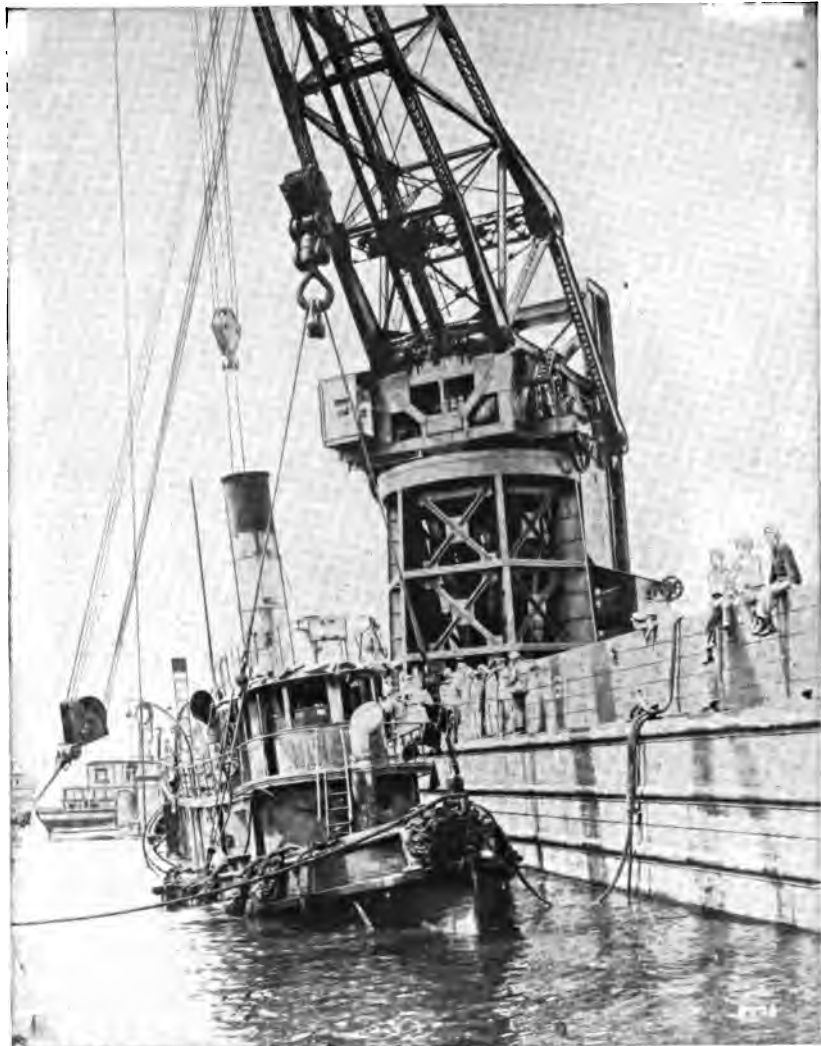
There are in operation thirty winches in the ships and twenty gantry jib cranes on the piers, being fifty hoisting machines in all.

In the shed or on the pier there can be 120 to 160 hoists, to remove the freight as deposited on the floor or else burtuned.

Extra bridges with the movable cross tracks can be installed if desirable. The height of lift of the interior cranes will average much less than that of the winches or external cranes.

As the traveling hoists will be more than double the number of the winches and gantry cranes, with a much less height of lift, and as this number of hoists can be increased, there is no doubt but that there can be no congestion on the pier.

This is given to illustrate the most severe conditions:



Powerful revolving crane tackling a big job, raising the sunken tug "Massosoit"

If the whole length of a pier 900 feet long is necessary for cargoes being tiered five feet high, then 300 feet of such a pier would be approximately necessary when tiering fifteen feet high. Then the longitudinal distributing would only be one-third of what it would be tiering only five feet.

The pier could therefore be divided into three sections by its cross traveling bridges and each section equal to a 900 ft. pier.

In actual practice less than one-third the number of trains will be necessary. The great number is given as showing possibility of the great excess of capacity.

The most valuable floor area is conserved and congestion is removed.

Congestion, therefore, is not necessary on the space at the water's edge, either within the shed or on the quay or pier.

No place at a successful terminal must be a congestion point. There must be direct coordination, especially for outbound freight, between the car and the ship and between the ship and the shed. These freight movements must be performed by machinery to avoid other points of congestion.

The entrance to a pier from the roadway especially with the two-story shed is another congestion place.

Warehouses should be six stories in height, but sheds one story.

Generally when a pier or quay is congested by the usual surface freight movements, the customary procedure is to ask for an appropriation of \$500,000 to \$1,000,000 for another pier and this process is continually going on.

From exact statistics published in every standard work on terminal engineering as to the use of

mechanical appliances, the transferring capacity of a pier or quay has been increased three and four times by the use of the above mechanisms.

It therefore costs far less to install mechanical appliances with correctly designed terminals to remove congestion, than to construct new piers and quays.

European Marine Developments

Exclusive Correspondence of "Pacific Marine Review."

LORD PIRRIE'S REVIEW

IN his interesting statement to the British press on August 9, Lord Pirrie, the controller general of merchant shipbuilding, spoke quite candidly about the causes that hinder a faster rate of construction in the shipyards of the United Kingdom. The most important, of course, is the shortage of skilled labor. The industry is still suffering from the wholesale enlistment at the beginning of the war. New merchant construction only comes third in its claim on available supplies of labor now. The repairing of merchant and naval ships has the first call, and new naval construction the second. Naval work now employs 25 per cent more labor than merchant construction. Lord Pirrie indicated that at the moment he hesitates to demand from the war cabinet the return of the badly-needed skilled shipyard workers from the fighting line, but he hinted that he feels that the time is coming when he must do so. Another interesting point is that in the last seven months military and home requirements have necessitated special attention being given to oil ships, transports and meat boats. These vessels take more labor and more time than the ordinary kind of cargo steamer, and Lord Pirrie estimates that if effort could have been concentrated upon cargo vessels only we could have produced another quarter of a million gross tons of shipping this year.

Women in the Shipyards

In connection with the above-mentioned shortage of skilled labor in the shipyards, one has, however, always to remember that the introduction of female labor into the shipyards is one of the most remarkable developments of woman's work brought about by the war. Today women are to be found among the riveters taking the place of boys in heating and conveying the rivets to the men who drive them home. They are working in blacksmiths' forges; they red-lead iron work, and do part of the paint work. All over a shipyard they may be seen tidying up, shifting scrap iron, carrying bunks of timber, pieces of angle iron, and scrap bars. Girls unpack big cases of machine parts and gear, and frequently unload bars of iron from railway wagons at a speed which surprises the onlooker. The wages which women receive for all these and many other forms of labor in which men alone used to be employed are double what the men used to be paid before the war.

Women's work in the joiners' shops is particularly valuable, especially in the case of the planing machines, with which they produce a very large output. In the engineers' section of the shipyard also—outside of the marine engine works—women's help is much in demand. They work various kinds

of machines, such as screwing and boring machines; they face up flanges, oil and clean all machines, and sharpen tools. Experienced girls are very skilful in the manipulation of such powerful machines as those used for cutting angle iron and for keel-bending. They even drive electric cranes and winches, work which demands the greatest steadiness and care and a large amount of nerve. Women are also being employed in numerous ways in engineering works, where the proportion of female labor is considerably greater than that in the shipyards on account of the larger number of machines available.

First Rivetless Vessel Launched

The first steel vessel built without rivets here has just been launched "somewhere" on the south coast of England. The launch took place in the presence of Lord Pirrie. The vessel was built in a shipyard operated by the Inland Waterways and Docks Section of the Royal Engineers. The plates, instead of being riveted and caulked, are joined together in one process by electric welding. This means that the plates are held together temporarily by bolts, and that the joint is then submitted to local heat by means of an electric arc, so that the two plates are fused together. It is computed from the results obtained on this experimental vessel and other admiralty work that a saving of 20 per cent, or possibly 25 per cent, could be effected in both time and material by this process. I understand that the United States Shipping Board have been in close touch with this experimental work, with the result that arrangements are in hand for building a number of 10,000 tons standard ships in the production of which "riveters" will become "welders". Whilst the first vessel just launched is rivetless, it is calculated that these large vessels will only have about 2½ per cent of the originally intended number of rivets. In the vessel just launched the "shell", up to and including the bottom seam of the bilge plate, is continuously welded inside and out. The cross seams are similarly treated. The outside is continuously welded and the inside "tack" welded. "Tack" welding means welding a short section, say three inches, and then skipping another section of about twice as much. The frames, floors, deck brackets and non-water-tight bulkheads are all "tack" welded; the water-tight bulkheads are continuously welded. In the case of the deck plates, "butt" welding, i. e., the plates arranged end to end, without any overlap, has been adopted. In the construction outlined it is considered that a good margin of safety has been allowed.

Oil-Engined Ships

Periodically in pre-war days Sir Marcus Samuel used to describe the British shipowners' and the British shipbuilders' lukewarm interest in oil en-

gines as something which would in the long run involve them in loss of money. Coming from one of the world's largest oil owners, the criticism was in some quarters held to be not altogether unbiased, but as the chairman of the "Shell" company followed it up by himself becoming an owner of Diesel ships there was little to be said for the objection. Moreover, as a simple matter of fact, both British shipowners and British shipbuilders were at the time singularly shy of oil engines. That they are of a different mind now is highly probable, although with both industries operating under severe war conditions it is difficult really to tell. On other grounds, however, builders and owners may reasonably resent the revival of Sir Marcus Samuel's criticism. With the shipyards and engine shops under control, builders have no choice in the work they are doing. Owners cannot order the kinds of vessels they would like, and the prospect faces them of being obliged to take for a considerable time after the end of the war practically anything they can get. For the fact that large fleets of standard steamships are being built the State is therefore responsible—not the shipbuilder or the shipowner.

\$20,000,000 on Concrete Ships

Reports from the various reinforced concrete shipyards in England, Scotland and Ireland show that good progress is being made in the construction of 1000-ton sea-going barges for the admiralty department of Merchant Shipbuilding. The program of construction authorized comprises vessels representing some 200,000 tons of shipping, and a capital outlay estimated at nearly \$20,000,000, apart from the cost of land and shipping plant. On the designs adopted, the saving in steel is fully 70,000 tons on what would have been required for steel ships of the same carrying capacity. According to latest advices the United States has only two concrete shipyards ready for operation, compared with nearly twenty in the United Kingdom. On the other hand, America is to be credited with the completion of one reinforced concrete steamship of 5000 tons capacity, an experiment which has been amply justified by the vessel on her trial trip.

Shipping Companies and the Emigration Bill

The shipping companies are deeply stirred about the emigration bill that is now before a grand committee of the House of Commons. They declare that if the bill is carried it will handicap British ships in favor of their competitors on the Continent, who will not be hampered by the regulations of the bill. These regulations, they say, will not stop emigration, because intending emigrants could easily travel by way of the Continent, but it will stop a good deal of British shipping. The bill proposes to set up an executive authority which will have power over the United Kingdom only. It is to comprise representatives of the colonies, and the companies think this one-sided, as it will have no control over the Dominions and colonies, and to all intents and purposes it will be over the Board of Trade. Passenger agents are to be licensed and to pay fees which will amount to over \$250,000. The companies declare that passenger agents are all respectable men, already guaranteed by a responsible authority. Their final grievance is that the effect will be to place the industry under the rule of the permanent officials, and to stop both emigration and transmigration in British ships.

Danish Shipping Amalgamation

It is reported from Copenhagen (Denmark) that the Danish Progress Steamship Company is taking over the eleven steamers belonging to the Vesterhavet Rederi, and that the latter will be wound up. In exchange for their 2,000,000 kroner of capital (of which half consisted of free shares), the Vesterhavet shareholders will receive an equal number of Progress shares and 13,000,000 kr. as a special payment for the fleet and other assets. During the war the Vesterhavet Company has been particularly conservative in its dividend distribution, and has collected large reserve funds. The Progress Company will issue shares to the amount of 5,150,000 kr., of which 2,000,000 kr. will be applied as mentioned above, the balance of 3,150,000 kr. being offered for subscription at the rate of 250 per cent.

Hamburg Hard Hit

Note already has been made of the fact that Hamburg is more than ever feeling just now the pinch of war, and I am told through a neutral quarter from Amsterdam that the discontent entertained because of this among the leading citizens is the greater because of the lack of sympathetic recognition of their position in Berlin. Not far short of a twelvemonth ago, indeed, the German government declined a request of the Hamburg local and commercial authorities for an imperial grant to put their town and port into such a state as might be necessary for the resumption of business on the conclusion of peace. The Berlin government apparently could promise neither a grant in aid nor the essential labor for carrying out the work, but suggested that both might be forthcoming when peace was made. This afforded small comfort to the Hamburg authorities, on whom the exigencies of the war have fallen so heavily that they have been compelled to allow the port to fall into a condition of neglect, which bodes ill for the future commercial success of Germany overseas when foreign markets are again open.



The "Concretia," the first of a Canadian fleet of small concrete steamers

Doubtful Views on American Marine Expansion

WE reprint herewith three letters from the pen of Mr. J. J. Slechta, which were published during August by the New York Journal of Commerce. While these letters are somewhat pessimistic they may serve to curb over-optimism on the part of those who see such a wonderful future for the American Merchant Marine. We do not subscribe to all of Mr. Slechta's views on the subject, but the letters touch upon many phases of a situation which will require all the ability and statesmanship of which the country is capable to meet. Whether our readers accept the same views as set forth in these letters or not, they cannot fail to be interested in such ably expressed arguments as will be found below. In the closing paragraphs of his second letter Mr. Slechta intimates that the retention of a vast merchant marine by this country might have the effect of provoking still further international struggles, but is not the corollary of this statement equally true that the absence of a great merchant marine invites conquest. The letters, in question, are reproduced herewith in the order of their appearance in the New York Journal of Commerce.

(Letter I.)

New York, Aug. 7, 1918.

Editor of The Journal of Commerce:

Sir:—It is high time that the best minds of our country, in the ranks of statesmen as well as business men, began to devote intensive study to the problems which are certain to arise in shipping affairs when the war has been brought to a successful conclusion. To those who attempt to lift the veil of deepest obscurity in which the future must yet remain, the following are some of the serious questions which arise:

(1) Should the war continue for two years more, as seems extremely probable, and this country's ship building efforts continue unabated and, even as is to be expected, increase in effectiveness, what may we expect in the matter of the relative position of American merchant marine resources?

(2) Will the tonnage acquired revert to private control as soon as demobilization is an accomplished fact?

(3) If so, will conditions affecting the operation of tonnage by private interests enable owners to compete successfully with foreign shipping?

(4) Again, should America's merchant marine reach a total greater than, or as great as, that attained by Great Britain, will our supremacy, or at least equality be maintained by the ability of American yards to produce new tonnage as cheaply as foreign yards can build?

Correct answer to each of these questions must depend upon so much of the unforeseeable that speculation may prove of little more than academic interest, but the efforts of many competent minds to solve the problems will be of incalculable value when the country is face to face with the complexities of world reconstruction. Many hasty and ill-advised decisions, to which after-war periods are exceedingly liable, may be avoided by anticipating the problems as far as may be possible.

The writer will not attempt to answer these

questions in an exhaustive way, but hopes merely to point out some of the possibilities which must be reckoned with by those who hope later to have a share in the development of American shipping, or who confidently anticipate for this country a commanding position in overseas transportation facilities.

Should peace be two years away, the tonnage built or laid down during the ensuing period may confidently be expected to bring the total deadweight capacity of American deep sea vessels to 20,000,000 tons. It is not likely that during the same period British yards can exceed their present average output, and the same is true of other European builders. In view of the very heavy losses to which submarines have subjected British tonnage, it is doubtful if the total deadweight capacity of Britain's shipping, other than small coastwise carriers, will exceed the figure mentioned above. Probably the total available to the rest of the world will not much exceed another 20,000,000 tons. It is, therefore, distinctly within the realm of possibility that we may, within the next two or three years, see the American flag flying from one-third of the total merchant fleet of the world.

The total tonnage of vessels of the types used normally in international shipping, as above estimated, is not very much, if any, less than the total available when the war broke out in August, 1914. But the changes in the relative totals of tonnage owned by the respective maritime powers will be sweeping indeed, especially with reference to America and Great Britain. Of the total before the war, Great Britain controlled approximately 40 per cent and the United States less than five per cent. At the end of 1920, should war continue to July, 1920, Great Britain is not likely to control more than thirty per cent., with the United States in possession of an equal proportion.

Always on the assumption that ship building continues to gather momentum in this country as now planned for at least two years more, the supply of tonnage available for overseas transportation at the end of the war will be approximately equal to that in existence in 1914. Any anticipation of the probable course taken by the Government in operating or turning the Shipping Board fleet over to private control, must take into consideration the probable demand for tonnage, in proportion to that which prevailed before the war. Let no one suppose that the period immediately following demobilization will witness a commercial interchange of commodities which will be in any degree commensurate with war time traffic in merchandise and armies. The complete disorganization of peaceful industries, the uncertainty and doubt which are bound to limit activities in all but absolute necessities, must perforce affect profoundly the volume of international trade for years to come. It is the conviction of many close observers that with a tonnage supply at least equal to that in use before August, 1914, the demand for space in ocean carriers, when demobilization is completed, will not be as great as in the years immediately preceding the war.

It is axiomatic that the volume of purchases abroad by any nation is distinctly limited by the

per capita purchasing power of that nation's population. There can be no one who supposes that the per capita purchasing power of the British, French and other belligerent peoples will be as great in 1920 as in 1914. One factor only might serve to increase purchasing power beyond the limits fixed per capita wealth and that is borrowing power. But there will be no one to lend in the generous measure which the circumstances will assuredly demand. Renewal of purchasing power can be effected only by re-creation of wealth. Every nation whose resources have been depleted by war must seek to rebuild its national wealth by the utilization of its own undeveloped resources. There will be a demand for raw materials indeed, but each nation will strive to use its own. We may not logically anticipate a revival of international exchange of manufactured products in any degree approaching that which existed before the war.

Even among those nations whose wealth has not been seriously affected by war, there must be a relatively decreased power to purchase by reason of the greatly increased cost of production. It has become apparent that wages in all the industrial nations will have advanced to a degree unprecedented. That there will be adjustment downward is perhaps inevitable, but the process will require many years. In the meantime, the demand for manufactured goods in South America, Asia and Australasia will be lessened by the inevitable consequence of prices higher than those which ruled before 1914.

The writer is therefore convinced that the volume of world trade after the war will be less than before it began. But granting that it will not be less, we are still confronted with the fact that there will be, in all probability, as great a tonnage for its transportation as was then found necessary. What may we reasonably expect the earning power of ocean tonnage to be? Unquestionably it will be determined by the competition of owners, as before. In early 1914 the time charter rates for cargo carriers ruled at about \$1.20 per deadweight ton per month. This rate represented a moderate return on tonnage which cost not to exceed \$75 per deadweight ton to build, fully equipped. After peace has come and tonnage is released from war service, will earning power be determined by the cost of tonnage or will the value of tonnage depend upon its earning power? Because an American owner holds tonnage at book value of \$350 per ton, will a prospective charterer pay him more for it than for a Dutch or Swedish steamer if he can secure the latter at a lower figure? I think not. A second factor which will determine tonnage values then as before is the replacement cost. No prospective purchaser will pay the United States Government \$250 per ton for a used vessel, if he can place an order with a British or Swedish builder at \$200 per ton. No shipper of American exports will engage space at \$20 per ton in an American vessel if the British carrier is offering it for \$15 under equality of circumstances.

Upon such considerations as these must depend answer to query No. 2, above. It is to be supposed that the Government will, of course, write off some of the cost of the fleet, as a part of the cost of war equipment, but how much it will write off and what conditions it makes for private operation

will largely determine the degree of its success in turning tonnage over to private interests.

It must be apparent that this can be done only if private operators are convinced that the prospects are reasonably good for at least a moderate return upon the capital employed. To be thus convinced they must settle to their own satisfaction the questions which are here stated, and doubtless many others. Prospective operators will wish to determine, so far as may be possible, not only the conditions upon which they may operate under American registry, but the conditions which are likely to affect the operation of competing tonnage. The element of risk will be greatly reduced if American owners are to be privileged to transfer vessels to foreign flags, as was the case with all countries before the war. On the other hand, if this privilege is given and the selling price is fixed at a relatively low figure, there will be much purchase of tonnage as a purely speculative venture. It is obvious that tonnage will not be offered for sale until the period of demobilization approaches an end. The market value of same will then be largely determined by the prices at which builders here and abroad are offering to construct new tonnage, modified only by the difference between the demand for vessels for prompt delivery and for delivery in, say 6 to 12 months.

J. J. SLECHTA.

Letter II.

New York, August 8, 1918.

Editor The Journal of Commerce:

Sir:—Perhaps the next most important item to receive consideration is wages of crew and officers. Under existing legislation the personnel of American merchant vessels is the highest paid and best fed of that in any maritime country. The Shipping Board has determined upon a policy to make our crews and officers 100 per cent. American and the decision is to be applauded, as a war time measure. But what must be the attitude of the prospective operator of American tonnage, who contemplates carrying freight or chartering his vessels in competition with British, Japanese, Norwegian or Swedish owners, who assuredly can obtain crews for very much lower wages. Should we not, perhaps, take a leaf from the book of Britain's experience? Her merchant fleet operators began to feel the pressure of continental competition in this respect some 12 to 15 years ago. Apparently she weighed the relative advantage in 100 per cent. British crew on what tonnage her owners chose to retain and the advantage of retaining all her tonnage and permitting her capitalists to get their labor in whatever market they deemed expedient. Consequently every owner of more than one or two vessels soon adopted the expedient of manning at least a part of his fleet with Chinese coolies and laskers, or other Oriental labor. The wages of the crew and officers on Japanese tonnage is notoriously low. What changes may confidently be anticipated for the after-war period which will relieve the apprehensions of American operators in this regard?

What of costs of repairs? Since the war, American repair yards are receiving from three to four times as much for repair and reconstruction work as before 1914, and even then the repair costs in American yards were the highest in the world. Is there any ground for expecting that costs here

after the war will be reduced to a level with those to be made effective in Great Britain, Germany or Japan?

There seems to be an undercurrent of opinion in Government circles that the pre-war freight rates were too low, and investigations of rates now being conducted are looking to the possibility of establishing higher rates from American ports to ports abroad. This is frank recognition of the fact that American tonnage held at book values not higher than those before the war could not operate profitably in foreign service without higher rates. A very common rate on coal charters from Cardiff to the River Plate in the period immediately before August, 1914, was 12 shillings, or, say \$4 per ton, loaded and discharged at the expense of the vessel. The rate from Norfolk to the Plate is now \$18.50 on the same conditions. Who shall say at what intermediate figure the rate shall be fixed for American vessels carrying coal on this route after the war? Let us say that the rate is fixed at \$8 per ton. A cargo carrier standing on the books of an operator at, say \$125 per deadweight ton, can earn a good profit in transporting coal to Rio de Janeiro at \$8 per ton and coffee homeward at, say \$10 per ton. But suppose that the British or Norwegian carrier offers to transport Cardiff coal at \$6 and coffee to New York at \$8 per ton. Is it to be expected that in that event "trade will follow the flag?" What trade will really follow is profit, and in the hypothesis suggested there will be no trade for American coal and no business for the American shipowner, because profit will be missing.

The truth is that if ocean freight rates after the war are fixed by this Government they will be without effect unless they form part of an international agreement, establishing not only uniform rates but uniform wages, both for crew and for labor employed in building and repairing vessels. Such an agreement is, of course, possible, if all the laws of economics are to be disregarded, but obviously it is improbable.

Finally, let it be assumed that conditions after peace is declared will permit American owners to operate tonnage profitably in competition with foreign tonnage; in other words, that conditions of supply and demand, labor and wages, and others affecting cost of operation will be equalized as a result of readjustments growing out of the war. Will the same readjustments bring about equalization in the costs of manufacture and production of new tonnage? This, of course, involves the steel industry most significantly. It must be borne in mind that, whereas the percentage of steel output in this country entering into ship construction before 1914 was very small indeed, that of British steel used in shipbuilding was relatively very large. In this country the steel output has to a large extent been diverted from peace time industry to the abnormal demands growing out of war. The demand for railway material, construction material and general industrial purposes which will ensue after the war will at least to a large extent offset the present demand for war supplies. Will the same be true in anything like the same proportion in Great Britain, if we exclude steel for shipbuilding?

The writer is convinced that British competition for business in steel for ships will tend to force the steel producers in this country to quote prices much below those which they can obtain in domes-

tic trade for uses other than ship construction. The same tendency is likely to induce labor to accept wages in British yards much below those which American labor will accept in the same class of employment. In spite of the great economic changes certain to affect wage scales in European countries as the result of after-war re-adjustments, there is not the slightest justification for the belief that the difference in ship production costs here and in Europe will be less to our disadvantage than before 1914. This difference will present one of the gravest problems to those charged with the effort to make it possible for us to maintain a favorable position in ocean transportation facilities. Without the possibility either of building as cheaply as our competitors or the privilege of buying foreign vessels for transfer to the American flag, our merchant marine supremacy or equality will be evanescent—hardly more than a mirage, so temporary would be its duration.

In conclusion the writer feels constrained to state that he is not among those who hold briefs for a policy calculated to gain selfish advantage from the war to the detriment of other nations. In spite of the fact that war has emphasized inordinately perhaps, the spirit of nationality among all people, higher enlightenment must recognize the fact that if the great costs of this struggle are not to be in vain, the world must plan for a new economic order in the realm of international intercourse. If the world is to remain an armed camp, with the powerful nations ready to grasp every opportunity to increase their economic power at the expense of each other and of weaker nations, then indeed the retention of national merchant marine power is necessary and desirable, no matter at what cost.

If the successful settlement of the issues now involved brings with it also the dawns of a new and better era in international affairs this nation can well afford to let those peoples supply without hindrance such services and such goods as they are able to provide more cheaply and more readily, under equality of circumstances. Such a policy will add to the sum total of well-being and happiness of all the world and would make war an impossibility, as nothing else can.

J. J. SLECHTA.

Letter No. III.

New York, Aug. 9, 1918.

Editor of the Journal of Commerce:

Sir:—Since letter No. I appeared in your columns a number of the writer's friends have protested that to raise questions as to the possibility of American owners competing successfully with foreign owners after the war is wholly futile, for the reason that this country is definitely committed to a policy of maintaining a large mercantile fleet at any cost. I believe that this is, in fact, the attitude of the American people at this time. You have so expressed yourself in editorial utterance. If the question is to be approached and dealt with only upon that assumption, it seems to the writer that there can be little difference of opinion among practical shipping men concerning the basis upon which a merchant marine is to be maintained.

The first requisite, and one which is comparatively simple of attainment, is the revision of all laws on the statute books relating to shipping, to the end that the building, purchase and mainte-

nance and operation of merchant ships under the American flag be without restriction of any kind. In other words, American owners must be privileged to build, buy, equip and man their vessels where and as they choose, without interference or restriction. Such a course would place American owners on an even footing with all the world, subject only to the exception of subsidies and bonuses allowed by foreign countries to builders or operators of merchant tonnage. All of the great maritime powers have in the past made such allowances in one form or another. There have been mail subsidies, shipbuilders' bonuses, special revenue exemptions, etc., all of which would tend to place American tonnage at a disadvantage. If an American merchant marine is to be successfully maintained except at the heavy cost of direct taxation, even under the most liberal legislation, as above indicated, provision must still be made for subsidy in one form or another to offset similar grants which assuredly will be made to our competitors by foreign nations.

If a certain percentage of the crew is to be kept American, then special subsidies must be allowed to offset the difference in wage scales, whenever this is to our disadvantage. The same must apply to the cost of supplies, and also of repairs, in such cases as shipowners must necessarily depend upon American supplies and repair facilities. One way in which this might be accomplished is by granting free port facilities to operators of American tonnage, even though free port arrangements are not generally in effect after the war, as they assuredly should be.

This would enable ship owners to import ship's provisions, supplies, spare parts and material for repair without duty and thus enable them to buy in the unrestricted markets of the world.

If the subject is to be dealt with from a purely military and national defense point of view, there remains for adoption an alternative plan which presents many attractive features. Let the Government retain title to a large tonnage, say not less than 5,000,000 tons deadweight of the ships, most available and best adapted to serve as transports. Actual control of such tonnage might well be vested in the Navy Department. It would obviously be a very great and unnecessary waste to retain such a fleet in idleness in times of peace. Such a fleet might well be wholly American as to officers and crew, maintained on the highest possible standards of efficiency. Vessels so owned could then be leased for long periods, subject to immediate call by the Government in time of national need; and the revenue thus derived, while doubtless insufficient to pay the initial cost and interest on investment, would in large measure, at least, eliminate necessity for heavy taxation. The loss sustained could appropriately be borne by the people as a legitimate cost for an amply demonstrated necessity in any well ordered programme of national defense.

Such a fleet could also serve to control rates in overseas trade, vessels to be allotted to operators who might be required to place them in trades where lack of competition in ocean transportation makes American export trade difficult. The threat thus always available for use would check tendencies to tactics employed by the "Conference Lines,"

concerning which so much was heard just prior to the declaration of war, and concerning which a number of litigations and investigations were in progress at that time.

J. J. SCHLECTA.

THE SHIPBUILDING OUTPUT

THE pennants awarded by the Emergency Fleet Corporation for shipbuilding progress continue to come to the Pacific Coast, although the July award includes an Eastern wooden shipyard. In the case of the steel plants, the Skinner and Eddy yard No. 1 was awarded first place for the month of July, with the Bethlehem Shipbuilding Corporation's Alameda plant second, and the Northwest Steel Company's Portland plant third. Among the wooden yards, the Grant Smith-Porter Aberdeen, Washington, yard was awarded first place, the St. Johns plant of the same company second, and the Foundation yard at Kearney, New Jersey, third. It is noteworthy that other yards on the West Coast are seemingly getting into a pace which will make the regular record holders, who have figured in the awards so frequently, look to their laurels. The Ames Shipbuilding and Dry Dock Company recently launched the "Westmead" in 69 working days, as compared to their best previous launching of 90 working days, and other yards are showing similar signs of speeding up production. The shipbuilding output in the United States for August—that is, vessels building for the Emergency Fleet Corporation—totaled 340,145 deadweight tons. This tonnage was made up of 41 steel ships of 236,045 deadweight tons, augmented by the delivery of three vessels, aggregating 25,600 tons, built in Japanese yards. This brings the total deliveries in steel ship tonnage to date up to 288 vessels, aggregating 1,799,481 deadweight tons. The total is divided as follows: Requisitioned ships, 232, of 1,446,831 tons; contract, 56, of 351,650 tons. There were launched during August 44 steel ships.

The wood shipbuilders jumped into the game with a vengeance during August with the delivery of 22 completed ships, of a deadweight tonnage aggregating 78,500 tons. Eleven other ships were virtually completed and ready for delivery to the Shipping Board, but for various reasons were not actually accepted. They will be entered on the list of September deliveries. The Wood Ship Division went over the top during the last week of the month, turning over 16 completed vessels, aggregating 57,000 tons in the week ending August 31. Two of the vessels included in this total were composite ships.

There have been 184 wood cargo vessels launched to date, in addition to two wooden tugs.

"I feel that we have cause to be greatly encouraged," said Daniel H. Cox, Manager of the Division of Steel Ship Construction. "I don't think there is any doubt that we can keep our deliveries up to the steel ship requirements. Yards on the Pacific and the Great Lakes have been keeping up a splendid pace. The reduction in the time that it takes to build a ship now, as compared with a year ago, is astonishing. Formerly nine to twelve months was considered speedy. Now Skinner & Eddy, for instance, is delivering ships at a rate 84 days from keel laying."



On and About San Francisco Bay

THE Overseas Shipping Company has opened an office in Philadelphia, this making the sixth office, the others being located in Chicago, New York, Vancouver, B. C., Seattle and San Francisco. The San Francisco offices are in the Merchants Exchange Building, with B. C. Dailey in charge.

The Monticello Steamship Company has purchased the twin screw steel steamer "Ashbury Park" in New York, and will have her sent through the Canal to take her place on the San Francisco-Vallejo run. The Ashbury Park is a handsomely appointed day steamer, and fast.

Jack Densham, perhaps better known than any other newspaperman along San Francisco's waterfront, has enlisted in the British Submarine Chaser Squadron. Densham's farewell to his friends was couched in the following language: "We are off to the sea of adventure and this is by way of Good-bye. We seem to have gathered some friends to us, the ugly old bull dog and I. So we want to remark in passing, when out in the chaser fleet, the whizz of a shell and the engine room smell will announce "California" street. We are not after any commission, two score and three is too old, but we understand an engine and a ship from the truck to the hold, so we hope to be wearing our jumpers that never were any way clean; and using our strength, which is mostly in length, in strafing the Hun submarine. From Meiggs to the door of the channel, you all of you know the old dog, and you've all of you laughed at his antics and sworn that he swims like a frog. I have to leave him behind me, so, when he shows up on your lee, in daylight or dark, just ask him to bark and choke the Herr Kaiser for me." Jack Densham and his dog have been familiar waterfront figures for years, and there is not a man on the front but who wishes Jack all the luck in the world and a safe return with medals attached.



California sugar pine boards. The sugar pine is a valuable and easily worked wood

William M. Cline is now district passenger agent of the Pacific Steamship Company, taking the place of Hugh Brittain, who has been promoted to headquarters.

The first of the wooden full-powered motorships built for the Canadian Commonwealth in the Northwest has completed her first voyage from Puget Sound to Sydney, making the run in the splendid time of thirty-three days. The vessel is equipped with two 500-horsepower full Diesel engines of the McIntosh and Seymour make. The vessel is rated as a three thousand deadweight ton carrier.

W. R. Grace and Company closed a deal on the first of the month whereby they have secured the entire eighth floor of the Hoge Building, Seattle. The business of Grace & Company at Seattle has grown so rapidly of late that a move to larger quarters became imperative.

Duval Moore, through Stuart Haldorn, has purchased the schooner "Repeat" from Castle and Cooke of Honolulu, and after overhauling this vessel will be placed in the copra trade.

The State Board of Harbor Commissioners are working on plans for a 1000-ton barge which will be used in unloading vegetable oil cargoes from vessels in the stream. It is the intention of the Harbor Board to install pipe lines between the wharves at the new oil center at Islais Creek and the storage tanks to be erected by the different large importers of vegetable oils. Rail facilities will also be extended to serve the tank storage and heating and pumping machinery for handling the cargoes will complete a first-class oil terminal.

Pacific Coast tide tables for the year 1919, giving data for Western North America, Eastern Asia and many island groups, have been issued as Serial No. 83 by the United States Coast and Geodetic Survey. Copies of these tables, which are reprinted from the general tide tables, may be obtained at 10 cents each from the agencies of the survey, a list of which will be found in the first number for each month of the Notice to Mariners, which is published weekly by the Bureau of Lighthouses and the Coast and Geodetic Survey.

The British government has contracted with the Hongkong and Whampoa Dock Company (Ltd.), Hongkong, for the construction of six standard steel ships. These ships are now in hand and the first vessel will be launched shortly. The dimensions of this first boat will be 325 by 45 by 26 feet, having a carrying capacity of 5000 tons. This vessel has been constructed from American manufactured steel materials. Five other standard ships are in hand in this dockyard, each of 8000 tons carrying capacity; their dimensions are 400 by 52 by

31 feet. Four of these vessels will be built of American steel materials and the fifth one of British steel.

CHINESE STUDENTS ARRIVE

An event of more than passing interest during the early part of September was the arrival of the China mail steamship Nanking with 151 Chinese students on board. An extensive and interesting program of four days' duration was prepared for these young Chinese men, who will take up extensive courses in American universities, by the China Commerce Club of California. At a luncheon given to the visitors at the San Francisco Commercial Club by the China Commerce Club, Mr. Bentley read the following letter from Captain Robert Dollar, who had been prevented from attending in person:

"I regret exceedingly that a slight accident prevents me from being present with you today.

"We give you a hearty welcome to our city and our country.

"I congratulate you on the opportunity that is before you of finishing your education in this country. Learn all that is good and hold on to it, and ignore all that is bad.

"You owe your country a debt of gratitude in permitting you to come here to get knowledge that many millions of your countrymen and countrywomen cannot get, and when you return home you can repay both your own and this nation by strengthening and increasing the great friendship that exists between the two countries.

"The undertaking of your government to build ships for us to help win the war is much appreciated by all Americans.

"Study and learn how the trade and commerce between us can be increased. If you can succeed in this, your country will be splendidly repaid for sending you here and this country will be more than repaid for cancelling your Boxer indemnity."

Response to this welcome was made by Prof. N. C. Yang, dean of Tsing Hua College, who said:

"It is with heartfelt gratitude that I have the privilege of thanking the members of the China Commerce Club for the hospitality extended to us. The various pleasure trips, arranged to combine with things most useful and of educational value, show the extreme care and interest that you have taken in us. It is a token of the traditional friendship between America and China. On behalf of my party of fellow students, I can but simply say from the depths of my heart—I thank you all.

"The United States of America has always been ready to assist China. The introduction of Christian education, the open-door policy, and the contributions for relief to our people who suffer from misfortunes are but most general instances of American good will to China. The return of the indemnity fund enables my students to acquire the American education.

"American education is democratic. It is an education which both teaches and creates ideas and ideals. We are taught, but we do not have to follow, and when we follow, we follow not blindly. Such education is most suitable for the Chinese.

"Our faith and trust in America is assured by



Cutting up a white pine log in one of the mills of the California Sugar and White Pine Company

the increasing number of students coming over each year. The student party of 1918 is almost twice as large as the party of 1917. Of our party of some 150 members 83 owe their gratitude and privilege to the American people's indemnity refund. In no other country in the Western world are there so many students as in this country.

"Our absolute faith and trust in America is shown in our hearty support of the principle so nobly expressed by your most illustrious President, that democracy shall reign in this world and democracy will win.

"Such sameness of ideals binds our countries strongly. It must be left to the privilege of such organizations as the honored China Commerce Club of California to make the bond of friendship lasting."

BRANCH FOR STRUTHERS AND DIXON

The business of the well known San Francisco firm of Struthers and Dixon, freight forwarders and steamship agents, has increased and widened in scope so rapidly that it has been found necessary to open a Seattle branch of the house with G. R. Walker in charge. Mr. Walker needs no introduction to the steamship world as he has been prominently identified with the Alaska Steamship Company, the Alaska-Pacific Steamship Company, the North Pacific Steamship Company, and, of late months, as auditor, U. S. Shipping Board, San Francisco. As his assistant, Mr. Walker will have N. D. Phillips, who has also a large amount of experience to his credit, having been with the Pacific Mail Steamship Company and A. O. Lindvig and Company. The new branch office of Struthers and Dixon is located in the L. C. Smith Building, Seattle.

UNITED STATES INVESTIGATES COAL BUNKERING FACILITIES

An investigation of bunkering facilities on the Pacific Coast available for government ships has been started by the division of operations of the United States Shipping Board. James B. Smith, president of the King Coal Company of San Francisco, will have charge of the work.

Smith was appointed to the position by John H. Rosseter, director of operations of the United States Shipping Board. Rosseter announces that he will create every possible facility for the quick dispatch of vessels operated by the government, especially on the Pacific Coast.

He said that as time is the essence of all things maritime, it is essential that every facility be provided for the handling of government vessels with the greatest efficiency. Coal bunkering is one of the prime essentials in the rapid dispatching of ships and according to Rosseter there have been delays in some of the ports due to lack of facilities.

An Efficiency Association, formed by employees of the Pacific Coast Shipbuilding Company, is now in full swing, with virtually every department of the big plant represented on it.

Already it has staged noon-time entertainments

and is preparing for other affairs, and has taken an active part in perfecting the organization of the plant's band, and in technical matters as well.

The association, which meets every Wednesday, provides a ready-made machinery for the handling of special events for the men.

J. T. Shepherd has been elected chairman and F. A. Denhard secretary and treasurer. The membership, with department or scope of representation indicated, is: J. T. Shepherd, pipefitters; F. A. Denhard, store room; Fred Bishop, ship fitters; J. S. White, drafting room; H. T. Armstrong, office; A. T. Hurley, machinist; Tim Hurley, blacksmiths; J. Armibino, anglesmith; M. Finn, plate shop; Francis Neff, mold loft; H. Methvin, carpenters; C. Calders, riggers; F. Barrett, riveters; E. McKarley, slingers; J. S. Fields, laborers; R. L. Silvey, welders; L. M. Bruce, transportation; H. H. Tremble, company.

San Francisco Shipping Notes

UNDER a ruling issued September 14, by the War Trade Board no vessel under the American flag will be furnished with bunker coal unless her wireless apparatus is so arranged that no message can be sent without the knowledge of the Master.

Mr. Henry Fortmann, President of the Alaska Packers' Association, has tendered the free use of several of the packing fleet after the season is over for the purpose of training ships. No better craft for training purposes could be found and the Government should find the generous offer of the Alaska Packers' Association very helpful in training seamen.

The concrete ship "Faith", which, on account of the ban placed on shipping news, has dropped somewhat from the public's attention, is nevertheless making good. She reached a West Coast South American port safely, has discharged her cargo of lumber and is, we believe, now on her way to an Atlantic port with, probably, a cargo of nitrate or some other South American product.

D. C. Andrews & Co., Inc., of New York have opened offices in the American National Bank building, San Francisco, in charge of H. C. Ewing, where they operate as Transpacific forwarders under the title D. C. Andrews & Co. of California.

This company was established in 1884, and also

has offices in Boston, Philadelphia, Chicago and Buenos Aires, together with agencies throughout the world. It dispatches consolidated car shipments from New York and Chicago.

Mr. Ewing is well known to shippers on the Pacific Coast, having acted as general agent for the Lehigh Valley Railroad in San Francisco for many years.

The American Shipping Company of Chicago and New York has opened offices in the American National Bank building, San Francisco, in charge of the secretary of the company, R. A. Graser.

In a \$4,000,000 deal, whose details have been approved by the directors of both corporations, the Pacific Steamship Company, headed by H. F. Alexander, is about to purchase outright the great fleet of freight and passenger carriers owned by the Pacific Coast Company. The deal awaits only formal ratification.

With its consummation, the Pacific Coast Company will retire from the sea, having disposed of all its floating properties. Until November 1, 1916, it operated its ships under the name of the Pacific Coast Steamship Company. It then entered into an agreement with the Pacific Alaska Navigation Company by which the fleets of the two corporations were merged and placed for operation under the flag of a new company, the Pacific Steamship Company, with Alexander as president.

News of the deal under which the Pacific Steamship Company now purchases the Pacific Coast ships was obtained today.

Under the new deal, the Pacific Coast Company disposes of all of its vessels and its stock interests in the Pacific Steamship Company to the latter corporation.

The deal which has been pending for weeks is to be consummated at a meeting to be held in New York soon by officials of the Pacific Steamship Company and the officers and board of the Pacific Coast Company, of which W. T. Barnum is president.

In a nutshell, the old Pacific Coast crowd, which until the advent of Alexander a few years ago, was the dominant factor in coastwise and Alaska freight and passenger traffic, is to retire and to accept for its ownership of its fleet \$4,000,000. To cover this payment, the reorganized company,



Interior of a section of the rivetless steel barge recently completed in Great Britain and which has met with marked success so far

which will probably continue the name of the Pacific Steamship Company, will issue \$4,000,000 in first lien bonds payable at the end of fifteen years, with maturities probably beginning in ten years. A sinking fund is to be created for the retirement of the bonds at maturity.

The Pacific Coast vessels involved in the new deal include the "President," the "Governor," the "Senator," the "Queen," the "City of Seattle," the "Spokane," the "City of Topeka," the "Curacao," the "Ravalli" and the "Homer," the latter a vessel that operates in the California coast trade. The "Umatilla," another Pacific Coast ship, was wrecked several months ago on the Japanese coast.

Mr. James Montgomerie, Lloyd's chief surveyor for Scotland, recently had conferred upon him by the Senate of London University the degree of Doctor of Science for his thesis on the behavior of flat plates of shipbuilding quality when exposed to fluid pressure.

Mr. Montgomerie, who has held the degree of B.Sc. for a number of years, is well known on both the Atlantic and Pacific Coasts, having made a large number of friends in the shipbuilding world while acting as principal surveyor to the society in New York in 1914, during the visit to London of Mr. James French, the society's American chief.

THE FOREIGN TRADE OUTLOOK

EDWARD N. HURLEY, chairman of the Shipping Board, deserves the thanks of our Nation for calling to our attention the duty of all classes of the community with respect to foreign trade, especially farmers, manufacturers, merchants, bankers and, last but not least, shipowners. He tells us that when the war is over we will have twenty-five million tons of shipping and the question that troubles him now, as well as all our thinking men, is: How are we going to provide cargoes to fill the ships?

He gives us four concrete propositions:

First, "We have got to produce the goods to keep them busy." This appeal is to the farmers, manufacturers and miners and the answer to this is to produce increased activity in all our industries and, immediately after peace is declared and when there is no further use for ammunition, to change our munition factories over to produce articles of commerce, thereby furnishing employment to our unemployed and to our soldiers and sailors, and preparing for the great reconstruction period that all the nations that were engaged in the war must go through.

Second, "We have got to develop new markets to dispose of our goods." To carry out this we must send our best men to every part of the world and establish houses for the sale of our products, establish banks for financing and, in the end, to have organization of Americans actively and energetically to develop our trade or, rather to create it, as we have not nearly enough now. This is new business and requires our constructive progressive men to succeed in it.

Third, "We have got to fill those ships with raw materials on the return voyages." To a great extent those who are selling our goods will also do a lot of buying of raw materials. This will further emphasize the necessity of having men of initiative in the foreign fields. Here is an opportunity for our progressive young men—to be

backed up by plenty of capital. The British are well equipped, having establishments in every port of the world, and are ready to go at it as soon as peace is declared. To succeed in the foreign trade, our ships must have cargoes both ways. If cargo is only provided one way then the merchandise carried must pay at least 75 per cent more freight. Here shipowners, skilled in handling their ships are necessary, and, with the tremendous increase in our tonnage, a great scarcity of shipowners versed in foreign trade will have to be overcome and this business is not learned in a day. Therefore, this is a very important situation that we must face now and not wait until the war is over. A few of our far-seeing merchants and shipowners are preparing now, but the movement is not general.

Fourth, "We have got to creat world commerce in comparison with our present foreign trade, which is scarcely more than a drop in the bucket."

The comments of the last few lines in number three apply with equal force to this subject. At



A sugar pine tree ready for transportation to a saw mill

present, we have not the men nor the establishments necessary in foreign countries to enable us to undertake on a large scale the building of world commerce and it is going to be a gigantic undertaking to provide our prospective enormous tonnage with cargoes of our manufactured goods and farm products from our own country and return cargoes of raw material.

Therefore these questions have come home to many of us, in foreign trade, rousing us to be up and doing but what has been done is well expressed by saying it is hardly a drop in the bucket. While the conduct of the war must always be first in our thoughts, I think a strong concerted movement should be started all over the country, on Mr. Hurley's suggestions and get ready for what our competitors are pleased to call "the war after the war." No time should be lost, as it will take a long time at best to get ready. Parties

of our merchants should visit every country that we hope to do business with to make arrangements for this great expansion of our trade that we must have.

BALANCE SHEET OF INTERNATIONAL MERCANTILE MARINE

THE International Mercantile Marine has issued its annual report for the fiscal year ended December 31, 1917, showing surplus, after British excess profit taxes, charges and steamship depreciation of \$11,753,509, equivalent to \$22.72 on the preferred stock. In the preceding year the company showed \$42.10 earned on the preferred stock.

The report shows the following comparative statement of earnings derived from the operations of the American, Red Star, White Star, Atlantic Transport and Dominion Lines, together with dividends received from the Leyland Company and other partly owned companies:

	1917	1916
*Gross earnings	\$41,604,208	\$60,602,010
Miscellaneous income	9,541,546	9,514,104
Total	\$51,145,754	\$70,116,114
Operating expense, etc.....	32,871,453	40,471,441
Fixed charges	2,798,316	3,698,023

Profit for year†\$15,475,985 \$25,946,650

*After providing for British excess profits duty.

†Equivalent to \$22.72 a share earned on \$51,725,500 preferred stock after deducting \$3,722,476 depreciation on steamships for 1917. This compares with \$42.10 a share earned in the previous year.

Surplus account shows the following:

Profit 1917 before S. S. depreciation.....	\$15,475,985
Depreciation on steamships for 1917.....	3,722,477

Surplus for year 1917.....	\$11,753,508
Additional surplus Dec. 31, 1916.....	24,686,172
Total surplus	\$36,439,680
Preferred dividends	9,827,845

Surplus

The result of operating the International Mercantile Marine Company and its subsidiary companies, including Frederick Leyland & Co., Ltd. (American Line, Red Star Line, White Star Line, Atlantic Transport Line, Dominion Line and Leyland Line), during the year 1917 was as follows:

Gross earnings after British excess profits tax	\$60,027,266
Operating expense, including U. S. and British income tax, and subsidiary company bond interest.....	41,188,378

Net earnings	\$18,838,888
I. M. M. Co. bond interest.....	2,362,841
Depreciation on steamers.....	4,304,506

Surplus

Foregoing statement represents earnings of steamers directly operated by the International Mercantile Marine Co., together with earnings of the subsidiary companies (largely British), of which the entire issues of capital stock are owned by the I. M. M. Co., except Frederick Leyland &

Co., Ltd., of which company about 42 per cent of the preferred shares and 98 per cent of the common shares are owned by the I. M. M. Co.

The consolidated balance sheet of the International Mercantile Marine Company, as of December 31, 1917, compares as follows:

Assets		
	1917	1918
Property account	*\$143,220,617	*\$142,528,827
Int. in other companies..	15,471,546	15,697,794
Inventories	1,068,879	1,025,991
Accounts receivable	30,153,711	18,366,551
Interest receivable	41,483	12,937
Agency balances	295,836	434,331
Stocks and bonds.....	25,129,937	17,907,363
Cash	14,056,248	5,607,025
Deferred charges	1,192,141	2,707,537
Total	\$230,630,398	\$204,288,402
Liabilities		
Preferred stock	\$ 51,725,500	\$ 51,725,500
Common stock	49,872,000	49,872,000
B. & N. A. capital stock	242	242
Funded debt	49,291,299	50,370,714
Loans on mortgage.....	351,329	365,156
Loans, bills, etc.....	3,653	2,045,635
Accounts payable	34,381,621	13,152,696
Agency balances	711,647	203,036
Interest accrued	783,924	619,313
Reserve for liabilities....	2,547,741	2,109,808
Preferred dividends	1,551,765	.....
Miscellaneous reserves..	11,275,980	5,285,423
Deferred credits	996,814	3,846,706
Insurance fund	525,047	.....
Surplus	26,611,836	24,686,172
Total	\$230,630,398	\$204,288,402

*Depreciated valuation.

Addressing the stockholders, P. A. S. Franklin, president of the company, calls attention to the fact that in making comparison with the 1916 results it "should be borne in mind that the earnings for that year were exceptionally large and a marked decrease in 1917 net earnings was to be expected because of Government requisitioning of all of the company's steamers. The British steamers were requisitioned by the British Government in April, 1917. The two Belgian steamers in the fleet were requisitioned by that government as of 1916, so that all the steamers of your fleet are now operating under charter to their respective governments."

In addition to the reduction of earnings, there has also been a very material increase in taxation, both here and abroad.

"The difficulties of maintaining steamers in the highest state of efficiency, owing to the exigencies of war, have continued to increase," President Franklin says, "but the directors are pleased to record that everything possible has been done in this important direction, and that all the steamers are in a satisfactory working condition."

The cost of operating steamers during the year increased beyond all expectation, and expenditures for labor, supplies, and equipment of every kind continue to increase and are limited only by the requirements and necessities of the world situation resulting from the prolongation of the war."

San Francisco Bay Notes

ON the early morning low tide on September first the new 4,000 ton marine railway at the Barnes and Tibbits yard was safely anchored in place. The structure was floated into place at low tide and sunk with rails and old iron. The operation was successfully carried out and the structure is now ready for use.

The first steel steamer to be built at the Hanlon Dry Dock and Shipbuilding Company's Oakland plant, a 5,500-ton deadweight carrier, has been completed, held her official trials and been accepted by the Shipping Board. The time taken for delivery was considered excellent for a new yard on its first steel ship.

At the request of the Department of Labor, the efficiency association recently formed by the employees of the Pacific Coast Shipbuilding Company at the Bay Point, Cal., yard has changed its name to the War Industries Committee. It was found the organization, except for the title, exactly filled the scope of such a committee. The formation of such an organization has been requested by the Labor Department in all war industry plants.

The news of the change is given in the first issue of the shipyard paper published especially for the employees of the plant.

With the appearance of this paper, California comes up even with Pennsylvania, New Jersey and New York in the number of such periodicals published in shipyards or allied plants. Washington has three such papers, and Oregon, with its wooden yard papers, seven. More than two score are published in the whole country, the rest being pretty well distributed along the coast line. Three of California's four are published in the San Francisco bay region.

The effects of collaboration among the men are shown in the first number, whose illustrations include a picture of Charles Piez, vice-president of the Emergency Fleet Corporation, taken on his recent visit to the plant while in California with the Schwab party.

Ten thousand green men, many of whom had never seen a ship, have been turned into capable

shipbuilders by the education and training section of the United States Shipping Board Emergency Fleet Corporation, which has just established a class for instructors at the Suisun Bay plant of the Pacific Coast Shipbuilding Company.

Announcement of the scope of the section's work has just come from the east. More than a score of training departments have been conducted since the beginning of the work.

The class at the Bay Point yard is for the training of men who are to impart their skill to others in turn. Instruction of groups in the yard is a part of the six weeks' course, which is conducted by N. D. Cook, director of training. The arrangements for the courses were made by E. B. Sherwood, district representative of the training section.

The men in these classes are picked not only for special qualifications and aptitudes but with a view to securing instructors capable of efficaciously imparting their technical knowledge to new workers and of assisting men of some experience to advance to positions of greater skill. Five years' experience in his trade is one of the government's requirements for a man enrolling for training as an instructor.

This is part of the nation's vast task of building up a force of skilled men capable of building the "bridge of ships" on a minimum time programme.

On September 18th some three hundred and fifty San Francisco business men, members of the Chamber of Commerce, spent the afternoon and evening on the east side of the bay as guests of the Oakland Chamber of Commerce. The rapid strides being made by the East Bay city surprised many of the visitors, who did not realize that Oakland's population is now estimated at 375,000 and that there are over 1300 manufacturing establishments. The party was escorted in automobiles throughout the business and manufacturing districts and tendered a banquet in the evening. Mr. R. C. Warner of the Standard Oil Company presided at the dinner and H. C. Capwell and George C. Boardman delivered addresses.



The pattern shop of one of Oakland's engine building plants. This concern recently received an important order from the Shipping Board for the construction of twenty 825-horsepower Werkspoor Diesel engines



Edgar Ames, President of the Ames Shipbuilding and Dry Dock Company

It was Mr. Ames who made the tremendous growth of industrial Seattle, during the past few years, possible. Coming to Seattle in 1895, he became associated with the late Governor E. V. Semple in reclaiming some two thousand acres of land which were more or less partially covered with tide water at all times. Hampered by years of litigation and the consequent withdrawal of financial assistance, Edgar Ames drew on his personal resources to see the project through, and did see it through just in time for the present industrial emergency. Every one of Seattle's renowned steel shipyards is located within this reclaimed district. Although personally of a reserved nature, Mr. Ames, through his foresight and perseverance, has placed himself in an eminent position as not only the father of Seattle's industrial district, but also as the head of one of the noteworthy shipyards of the country.



Puget Sound Activities

By Special Correspondent

WITH the evident intention of furthering its interests in the Orient and for the increasing of its services between the ports of China, Japan and other far Eastern centers and the West Coast of the United States, the Pacific Steamship Company recently announced the detailing of several prominent staff men to duty across the Pacific.

According to A. F. Haines, general manager of the Pacific Steamship Company, R. D. Pinneo, for the past several months the New York representative of the company, has been chosen as head of a force of expert traffic men to go to the Orient with a view of further cementing the relations already established there by the company, and to prepare for the anticipated immense increase in trade with localities upon the cessation of the war. Mr. Pinneo is now on his way to Seattle, and is expected to sail for China next month.

Replacing Mr. Pinneo at the New York office will be Hugh Gallagher, for several years attached to the Pacific Steamship Company's staff, and who recently removed from San Francisco to Seattle with E. G. McMicken, the company's general passenger agent. Gallagher is already on his way to his new post.

In addition to R. D. Pinneo on the Oriental detail will be John J. Gorman, who has been enticed away from Dodwell & Company, with which latter concern he has been for the past eight years. Gorman will accompany Pinneo to the Orient, and so will E. E. Johnson, the present foreign trade expert attached to the Admiral Line's local staff.

With the passing of Capt. J. C. Hunter, for many years master of the Alaska Steamship Company's liner Northwestern, who succumbed to the after effects of an operation performed at Providence Hospital September 8, came the end of a most active career. Capt. Hunter was probably the oldest navigator in Pacific waters who had been in continuous active service up to the time of his death, for he was 75 years of age and had been at sea for a period of 59 years of that time.

Of hardy Norse stock, Capt. J. C. Hunter was born at Stockholm, Sweden, in 1843, and first went to sea when a lad of 16 years. He came to the Pacific in a sailing ship in the latter sixties. He was married at Victoria in 1880, after which Capt. Hunter removed to San Francisco, later establishing his home at Alameda, where his only child, Capt. Albert Thomas Hunter, now a Lieutenant Commander in the United States navy, commanding the S. S. Northern Pacific, operating in the war zone, was born in 1883. The

funeral arrangements were handled by the Masonic order, of which the deceased was an active member. Cremation followed. Capt. Hunter was in command of his vessel up until the night of August 31, this year, or when she was but one day out of Seattle, when attacked by the malady, gall stones, which necessitated the operation which resulted in his demise. It was the first time in his long career at sea that he was unable to bring his vessel into port.

SEATTLE DOCK EARNINGS

The gross earnings of the various units of the Port of Seattle for the eight months ending August 31 this year reached the immense sum of 1,542,408.08 according to figures just compiled by Matt H. Gromley, chief accountant for the port commission. These figures include the operation of the port ferry systems on Elliott Bay and Lake Washington.

The figures follow:

Terminals:	August	Jan. 1 to Aug. 31
Salmon Bay.....	7,499.21	\$ 41,703.87
Smith's Cove.....	117,861.30	645,906.16
Bell Street.....	27,769.66	191,958.34
Stacy Street.....	22,390.81	220,472.59
Hanford Street.....	19,723.49	107,021.47
Spokane Street.....	62,920.73	271,530.69
Canal Waterway (Ind. Sites)	754.64	7,272.48
Totals, Terminals.....	\$258,919.84	\$1,485,865.60
Ferry Systems:		
Elliott Bay.....	4,428.32	28,542.11
Lake Washington.....	4,573.05	28,000.37
Totals, Ferry Systems	\$9,001.37	\$56,542.48
Totals Gross Earnings Port of Seattle	\$267,921.21	\$1,542,408.08

AMONG THE WORKERS

Capt. J. M. Scott, head of the Scott Brothers Corporation of Mobile, Ala., is due in Seattle shortly to complete the transfer of several vessels recently acquired for French interests by his concern through the offices of Thorndyke, Trenholme & Co., Inv., of this city. Among these acquisitions is the British vessel now known as the Bowler, which formerly was the famous collier Zafiro, one of the historic units of Admiral George

Dewey's fleet in the engagement at Manila Bay, May 1, 1898, at which time the Spanish fleet was annihilated.

The Bowler is now a most unique craft, and probably the only one of her kind afloat. She was originally a steel vessel, but has recently been reconstructed by having a sheathing of 3-inch Douglas fir enclose her iron hull. Instead of a two-masted collier she is now a three-masted bald headed schooner rigged power vessel, her steam engines having been displaced by internal combustion oil engines. So far she has not been classified by either Lloyd's registry or the Bureau Veritas, and it is for the purpose of arranging this that Capt. Scott is enroute to this section.

Capt. John F. Blain, district officer of the United States Shipping Board, is on another business visit to the headquarters of the emergency fleet corporation at Washington and Philadelphia. He is expected back about October 1.

Miss Florence Fraser, former night nurse at the emergency hospital of the J. F. Duthie plant, was recently presented with a handsome portmanteau in which reposed a purse of \$175, the gift of the workmen of the Duthie plant. Miss Fraser was highly popular among the employees at Duthie's, for she was selected by them as sponsor of the steamship Western Star, one of the pair of 8800 tonners launched by this plant on July 4. Out of the ribbons from which dangled the container used at the christening, Miss Fraser has sewn a beautiful American flag which she intends to present to the vessel.

The drydock acquired by J. T. Heffernan at Portland some few weeks ago has been moored at the new Heffernan West Seattle site, and recently commenced operations. Among the first vessels lifted by the newly installed dock were the Norwegian steamship Sinaloa and the American steamship Ketchikan, the latter being owned by the Alaska Steamship Company, and the former being under charter to A. O. Lindwig & Co., of San Francisco.

Detailed to make an extensive report on coal bunkering facilities in the Northwest at the request of J. H. Rosseter, director-general of operations

of the Emergency Fleet Corporation, James B. Smith, president of the King Coal Company, of San Francisco, spent several days in this vicinity recently.

By an arrangement entered into between the United States Department of Labor, the International Longshoremen's Association and the Seattle Waterfront Employers Union recently, the employment halls operated on the open shop basis by the latter organization have passed into government control. T. V. O'Connor, international president of the longshoremen; Edgar C. Snyder, representing the Department of Labor, and A. F. Haines, general manager of the Pacific Steamship Company, and W. C. Dawson, of W. C. Dawson & Company, together with the sectional vice-presidents of the Longshoremen's Union, comprised the conferees at the meeting which resulted in the passing of the halls which had for years been a bone of contention along the local waterfront.

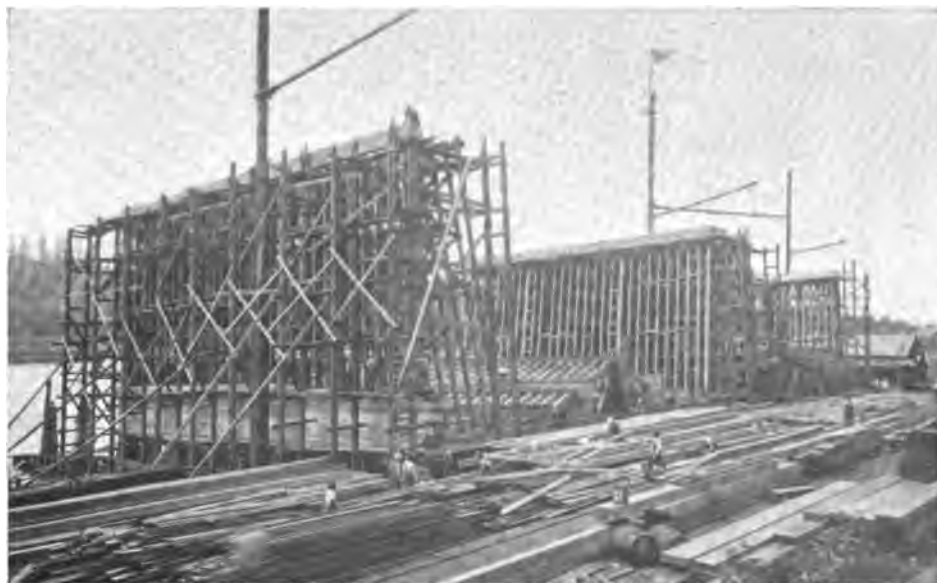
David Miller, for the past six years port engineer for the Standard Oil Company, has severed his connection with that corporation and joined forces with the firm of V. S. Jenkins Company, engineers and manufacturers agents, with offices in the Grand Trunk Dock. Miller's long years of experience in the care and repairing of machinery and equipment of the big tanker fleet is expected to be a splendid asset in his new environment.

Anticipating the continued growth of Seattle's water borne commerce, several former employees of the Geo. S. Bush & Co. have organized the Ocean Brokerage Co. with a view of entering actively in the shipping, both importing and exporting, freight forwarding, and fire and marine insurance business.

The new company formally opened offices in the Stuart building, and announcements were mailed to various shippers throughout the Northwest. The officials of the new concern, practically all from the staff of Geo. S. Bush & Co., have had years of experience in various departments of the business, and have launched into business for themselves.

W. R. Colby Jr., formerly secretary of Geo. S. Bush & Co., is the president of the newly organized concern. J. E. Allison, also from that firm, is vice-president of the new concern, and will have active charge of the export business. Allison formerly was associated with this department for the Chicago, Milwaukee & St. Paul Railway under F. J. Calkins, and is said to be especially qualified in this department. F. V. Sandin, who is to handle the import business of the new concern, has had six years of practical experience in custom house details and especially reappraisement.

As office manager for the new concern C. M. Small has been desig-



At work on one of the units of the new floating dry dock building for the Skinner and Eddy Corporation, Seattle

nated to that department. For many years he was with the Wells Fargo Company, the Great Northern docks, and later with Bush & Co., in which latter capacity he handled oil shipments exclusively.

Miss R. A. Cook, formerly secretary to the manager of one of the largest music houses in the Northwest, has been chosen treasurer of the new concern, while A. J. Coskey, with long experience as agent for belt line railroads, and formerly with the Nippon Yusen Kaisha line, has been chosen traffic manager.

R. J. Welch, once connected with the Pacific Northwest Demurrage Bureau and later with Mitsui & Company, and now an official of the Ocean Warehouse Company, of Tacoma, has joined forces with the new concern and will divide his time between Seattle and Tacoma.

R. E. Pitchforth, with a number of years experience with the Chicago, Milwaukee & St. Paul railway and the Pacific Steamship Company, will be the regularly accredited Tacoma representative of the new company.

NEW DOCK NEARING COMPLETION

With the delivery early in September of the first unit of the big new drydock being built by the Skinner & Eddy Corporation, Seattle can be said to have a third ship repair concern preparing to actively engage in the repairing and reconstruction of damaged vessels.

This unit is the first of four such which will eventually comprise the big marine lift calculated to raise a vessel or vessels aggregating 17,000 tons when entirely assembled. The first unit was completed at the plant of the Port Blakely Mills Company at Port Blakely, a Skinner & Eddy property under lease to Comyn, Mackall & Company, of San Francisco. However, the latter concern had no interest in the construction of the drydock, since that work was undertaken by a corps of Skinner & Eddy employees under the direction of J. Johnson, an old-time shipbuilder and employee of the Seattle plant.

The new drydock is being built in four sections, each 90 feet long by 120 feet beam, and each capable of being operated individually or collectively, as well as of permitting additional sections to be added at will. Another section will be delivered about October 1, and the entire dock is expected to be completed by the middle of December.

This new marine lift is being installed at the site formerly occupied by the Seattle Construction & Drydock Company's big 10,000 ton lift, since removed to the Harbor Island site of the Todd



Each of the four pontoons going to make up the completed structure will be 90 by 120 feet in size

Drydocks Company, Inc., the newly organized concern which succeeded the ship construction enterprise when that plant was purchased by the United States Shipping Board and turned over to Skinner & Eddy for operation as the latter's No. 2 plant.

NIPPON YUSEN KAISHA'S HALF YEAR

The report of the Nippon Yusen Kaisha for the half year ending May 30th, 1918, shows net profits after providing for depreciation of the fleet, insurance and ships' structural repair funds and war taxes, of 34,312,842 yen, including 684,513 yen brought forward from the previous term.

The directors now propose that this surplus be appropriated as follows.

	Yen
Legal reserve fund	1,681,416
Special reserve for war risk and depreciation of vessels to be built and purchased	10,000,000
Additional depreciation of the book value of the fleet.....	1,500,000
Special reserve	500,000
Dividend equalization fund.....	7,000,000
Directors' and auditors' fees.....	375,000
Dividend (10 per cent).....	1,879,680
Extra dividend (40 per cent).....	7,518,720
Fund for the training, protection and encouragement of seamen.....	350,000
Pension fund	2,500,000
Total	33,304,816

Leaving a balance to be carried forward to next account of..... 1,008,026

The remarkably strong financial condition of this company is well shown in the balance sheet for March 31st, 1918, which is as follows:

Assets	Yen
Reduced book value of fleet.....	29,879,543.95
Reduced book value of launches, barges, etc.	449,204.04
Buildings and land.....	7,941,357.61
Ships' stores in stock.....	955,711.84
Public loans and other securities.....	61,589,141.98

The men who buy the material



C. B. Winge, Purchasing Agent Elliott Bay Shipbuilding Company, Seattle



W. E. Gorman, Purchasing Agent, Patterson & MacDonald Shipbuilding Company, Seattle



George E. Moore, Purchasing Agent, Puget Sound Bridge and Dredging Company, Seattle



Wm. N. Voegtly, Purchasing Agent, Meacham and Babcock Shipbuilding Company, Seattle

G. E. Hunt, Purchasing Agent, Allen Shipbuilding Company, Seattle



for the men who build the ships



E. C. Gaumnitz, Purchasing Agent,
J. F. Duthie and Company,
Seattle



Chas. A. Barrow, Ames Shipbuilding
and Dry Dock Company,
Seattle



Lyle C. Bankson, Purchasing Agent,
Seattle-North Pacific Shipbuilding
Company, Seattle

C. L. Bankson, Purchasing Agent,
Todd Dry Docks Inc. and Todd
Dry Docks and Construction
Company, Seattle



W. H. Borrow, Purchasing
Agent, Skinner
& Eddy Corpor-
ation, Seattle



Cash at banks and in hand.....	69,723,871.00	Special reserve	11,500,000.00
Sundry debtors	7,090,223.86	Reserve for war risk and depreciation of vessels to be built and purchased	21,640,601.85
Total	177,647,054.28	Fund for training, protection and en- couragement for seamen.....	850,000.00
Liabilities, Yen		Pension fund	3,534,836.56
Share capital	44,000,000.00	Sundry creditors	17,820,086.68
Insurance fund	14,841,471.57	Amount brought forward from last account	684,513.73
Ships' structural repair fund.....	4,908,245.18	Net profit for the half year.....	33,628,329.21
Legal reserve fund.....	8,138,969.50	Total	177,647,054.28
Dividend equalization fund.....	7,100,000.00		
Fund for extension of services and Improvement of fleet.....	6,000,000.00		
Reserve for construction and repairs of buildings	3,000,000.00		

New Smith's Cove Project

AT a special Port of Seattle district election held in connection with the regular primaries on September 10, the voters of Seattle and King County indorsed all four propositions submitted by the port commission for the immediate and future improvement of the publicly owned harbor facilities by an overwhelming vote. In many precincts the vote was 8 and 9 to 1, and each separate proposition carried with a safe margin over the required 60 per cent. of the total vote cast.

These propositions involve the immediate construction of a new pier at Smith Cove, duplicating the present port properties at that harbor point, and the improvement of the present pier. The voters also sanctioned the proposition submitted at the instance of the war department which calls for the taking over by the Port of Seattle at the end of five years from its completion the proposed new \$1,250,000 pier planned by the government for Harbor Island. The last of the four propositions embraced the sanction of the voters to the port commission's proposal to add two additional piers to the Smith Cove terminals, making a total of four wharves at that basin, and providing for legislative sanction to the increasing of the ports bonding limit, now set automatically at 3 per cent of valuation, to a higher figure providing sufficient funds for the carrying out of the project.

Chief Engineer Geo. F. Nicholson, of the Port of Seattle, has already started work on the newly authorized Pier B at Smith's Cove, and has compiled the following summary of the several port projects recently endorsed:

"The present Smith's Cove Pier is known as Pier 'A', it being one-half mile long and the largest and most efficient pier on the Pacific Coast, is to be widened and extended to West Garfield Street, adding approximately 100,000 sq. ft. to the open wharf. This extension will enable the straightening out of the railroad facilities at the pier so that the efficiency of this great terminal will be materially increased. The slips on either side of the proposed extension to Pier 'A' will be dredged to the full depth of 35 feet at low tide. The berthing space will be increased from 4,000 lineal feet to 5,500, giving a total berthing space for 13 large ocean carriers. The cost of the above extension will be approximately \$400,000.00.

The construction of Pier 'B', which the Commission contemplates at once, will be the most gigantic and best equipped foreign trade pier on

either the Atlantic or Pacific Coasts of America. Great as is the public pier in operation at Smith's Cove, the new facilities will overshadow it. The new pier will do more, it will overshadow any pier of the kind both on the Pacific and Atlantic Oceans in North and South America. The new pier will hold a title beyond doubt in size and in modern equipment for handling heavy cargo. This second pier, of course, forms a larger part of the construction program this Fall. It will be 365 feet wide and 2,700 feet long, or a trifle over one-half mile long. A slip 350 feet wide separates the existing and proposed terminal. A new slip will also be dredged to the west of Pier 'B' and in all, the dredging excavation will amount to over 2,000,000 cubic yards, 1,000,000 of which will be used in filling two of the city waterfront streets, viz., Elliott avenue and Railroad avenue in their north sections, and which when finished will give a direct paved thoroughfare from the business district to Smith's Cove on an easy grade. Two 2-story cargo sheds 120 feet wide by 1,000 feet long will be constructed at the street end of the new pier. Four depressed tracks will occupy the central section of this gigantic pier, the two outside ones of which, on the open wharf, will be so located that the locomotive cranes can operate over same. Two surface shipside tracks will occupy the outer side of the structure. Crossovers will be provided every 500 feet to increase speed and efficiency in switching. In all, there will be four and one-half miles of railroad trackage on the new pier and a total of six miles of trackage including the Pier 'A' extension and connecting tracks with the large Interbay Railroad Yard, which is directly behind the new terminals.

A great deal of heavy freight handling equipment is contemplated in connection with the new pier. Two 10-ton traveling cranes, each operating on 120 ft. steel spans 22 feet above the open wharf will travel 1600 feet up and down the open area of the new structure, each crane serving one side of the pier. The elevated cranes are used in order that valuable open wharf cargo space will not be used by the operation of cranes. By this method, all the cranes will be operated above the cargo on the dock and the traveling cranes will be able to unload direct from cars on the depressed tracks to ship and vice versa. This equipment will be high speed cranes, with a view of handling heavy cargo faster than ever before. The cost of Pier 'B' will be \$2,000,000.00, and a terminal design

is being made that will hold the same place in ocean terminals that the Skinner & Eddy plant now holds in the American Shipbuilding industry. When Pier "B" is completed and the extension made to existing Pier "A", a berthing space of 11,000 lineal feet will be provided, enabling twenty-five large ocean going vessels to load and discharge at the same time. Two 35-ton locomotive cranes will also add to the loading efficiency as will a battery of electric tractors and tractor trailers. Each train with a capacity of 8 to 10 tons will increase the handling efficiency in the cargo sheds. Eight portable second floor loading platforms will also be installed in order to enable the loading and unloading in connection with the second floor of the cargo sheds. A 100-ton shear leg derrick will also occupy a prominent place on the pier to expedite the handling of heavy equipment. This efficiency in handling cargo on a tremendous scale is a special feature in the new design and will help facilitate the handling of the large China and Japan trade and the expected vast Russian trade.

The voters of the Port District approved a \$4,490,000.00 bond issue on September 10th, to cover the projects.

Present Smith's Cove Pier

Smith's Cove Pier, located on the north shore of Elliott Bay, is 310 feet wide and one-half mile in length, having almost 4,000 feet of berthing space. Water depth at fender line, 35 feet. It is now recognized as being the finest pier on the Pacific Coast. It may be regarded as two long wharves, back to back, with four depressed railway tracks between. About one-third of the area of the pier, or 130,000 square feet, is covered by one-story sheds, nearly 100 feet wide, which have a cubical content of 3,500,000 cubic feet. The remainder of the wharf comprising 260,000 square

feet is an open wharf, the east side being used for export lumber and steel, while the west side is utilized for the storing and bulking of vegetable and fish oils.

Smith's Cove Pier is equipped with a \$40,000.00 gantry traveling crane, which is electrically driven and lighted for night loading, and covers a section of the open pier nearly 900 feet in length. The crane serves the depressed tracks in the center of the pier, also 40 feet out over the channel alongside, so that cargo can be loaded direct from car to ship, and vice versa.

A structural steel shear leg derrick of 100 tons capacity, costing \$20,000.00 is provided for heavy lifts. Two locomotive cranes of 15 and 35 ton capacities each, are indispensable for handling freight on the open wharf.

Three miles of public railroad tracks have been constructed on the terminal by the Port Commission.

For the storage of vegetable and fish oil, two underground storage oil tanks of 8,000 barrel capacity, have been constructed. This type of construction does not take up valuable dock space, and the several compartments formed by the roof-supporting walls are very necessary on account of the many small shipments of the different kinds of oil. Numerous pipe lines have also been provided, together with dumping tables and centrifugal pumps for the economical handling of oil to tank cars. The open wharf has been provided with several flood lights so that boats can be unloaded and cargo distributed as well at night as in the day time. To the rear of the Smith's Cove Wharf the Port District owns twelve acres of land, some of which has been leased out to private industries. These industrial tracts are served with public railroad spurs.





Activities in Oregon Ports

By Special Correspondent

FRANK HAVISIDE, of San Francisco, here in charge of rigging vessels of the Foundation Company, has completed the standing rigging on 11 ships in 12 weeks and one of them was done in five days. He and his crew of 10 workers are being held up as the Coast champions.

Delay in the receipt of necessary steel, as well as some machinery, was pointed to as an obstacle steel men were unable to overcome in making September one of the best months in the history of the district in the matter of deliveries. The Emergency Fleet Corporation had promised an increase in steel shipments so that all requirements of the month might be met, but the builders are looking forward to being up to schedule during October. Added to material and equipment difficulties has been that of inability to obtain a sufficient force of laborers.

Names have been announced for 10 steamers, each of 9500 tons, the G. M. Standifer Construction Corporation has undertaken at its new Vancouver establishment, where three are under way. In order of their numbers they are to be the Cokesit, Coaxet, Waban, Wawalona, Nismaha, Olocksom, Weepatuck, Weepoiset, Pawlet and Bearport. The fourth and fifth ways there will be in service before the first of the year, only limited steel deliveries holding them back now.

In a new restaurant the Columbia River Shipbuilding Corporation is establishing 1200 men are to be given their meals at one sitting. The plans contemplate the food being served on a cost basis.

Laws of Oregon provide that no union man belonging to a National Guard organization can be called to perform strike duty, so union shipworkers of the district have organized Company L, of the new National Guard forces, and drill each Monday night at the Armory under First Lieutenant Clark, U. S. A. Some of the members are ex-service men, a few dating back to the days of 18'8. Age limits are placed at 18 to 45 years and it is said to be the first all-union National Guard unit in the country. At the plant of the Albina Engine & Machine Works a company of the Multnomah Guard, which is not a state organization, has been formed and drills are held after work in the afternoon.

Owing to financial limitations the Port of Portland Commission has decided to build a coal dock 250 feet long instead of 500 feet, though they will

retain the width of 95 feet as first planned. The structure will be contracted for under a cost plus basis and later may be extended. The Pacific Coast Coal Company is proceeding with its new bunkers, which will have a capacity of 5000 tons, while yard space will permit of flat storage facilities being developed that will care for 15,000 tons additional. At present the company is handling an average of 4000 tons of coal a week in lighters to ships here, that system being adopted in all cases since a recent fire damaged the old bunkers.

Charles Rudeen, of Portland, has been named a member of the Oregon State Board of Pilot Commissioners to succeed the late Charles G. Wilson, of the Clark & Wilson Lumber Company, who died the latter part of August. Mr. Rudeen was elected president of the Board, a position Mr. Wilson had filled from the time of his appointment, July, 1915, until his death. Others on the Board are Captain Wm. C. McNaught, of Portland, and Thomas Nelson, of Astoria.

Being unsuccessful in placing contracts at San Francisco for 10 steel steamers to be delivered after the war, Douglas Woodhams, of Douglas Woodhams & Company, No. 1 Charing Cross, London, spent a few days in Portland during the month on the same quest. Steel builders say they are willing to undertake contracts on a cost plus basis, but not to accept a lump sum with the usual conditions attached, because of the uncertainty as to when the conflict will be brought to a close.

Action of 6000 members of the Boilermakers' Union in refusing to work in steel shipyards Saturday afternoons during September, was met by the Willamette Iron & Steel Works September 14 with an order that every man leaving the plant at noon be discharged, 39 of them being listed. They were paid off the following Monday, together with six of the night shift. As there were 2300 men on the payroll the percentage was regarded strikingly small. The declination to work grew out of dissatisfaction over the failure of the Macy Wage Adjustment Board to announce its new schedule of wages and conditions Labor Day.

James B. Smith, of San Francisco, president of the King Coal Company, spent a few days in Portland the forepart of September, making a survey of bunkering facilities at the solicitation of J. H. Rosseter, director of the bureau of operation of the United States Shipping Board. Mr. Smith was quoted with having expressed himself pleased with the speed attained in bunkering ships from barges



Bow view of the "Nancy," launched at midnight by the Foundation Company, Portland, Oregon



Stern view of the "Nancy," ready for launching at midnight on September fourteenth

and of the preparations under way for increasing the shore bunkers here.

Henry Teal, of Portland, was the purchaser, September 12, of a block of \$1,000,000 of terminal improvement bonds the Commission of Public Docks disposed of to insure funds with which to complete the first unit of the St. Johns Municipal terminal and grain elevator. The bonds are of the 4½ per cent. class and were sold for \$939,400. The Commission disposed of \$1,500,000 of bonds a year ago with which to start the project. The 1200-foot pier will be ready for service in a few weeks, the completion of the 1,000,000-bushel grain elevator being expected about January 1.

In command of Captain Howard Payne, and with W. J. Grambs, head of the Sea Service Bureau in the Northwest, aboard, the steamer Chippewa was in Portland harbor September 12, with 200 young Americans being trained for all branches of the merchant marine. The vessel and her company made a fine impression and added weight to the assertion of Mr. Grambs that they would augment the American fleet with the finest material available.

Establishment of an employment managers' course at the University of Washington has been announced and Oregon builders have been invited to send men there, they to be trained at the expense of the Emergency Fleet Corporation and receive \$6 a day, while appointees of the Emergency Fleet Corporation will be paid \$4 a day. Not only are the men to be taught all employment details, but the system is depended on to standardize the work in all sections.

There is strong talk of increasing the towage rates for deepwater vessels on the Columbia and Willamette Rivers, because early in the month the Shaver Transportation Company had a fuel bill for one of its vessels, that towed a schooner from Astoria to Portland, amounting to \$155, whereas the revenue from the trip was \$150. With fuel oil at \$1.85 a barrel, as against 85 cents a barrel a year ago, they aver nothing is left for wages of crews and maintenance of their vessels.

July awards of the Fletcher Board, of the Emergency Fleet Corporation, drew for the Northwest Steel Company a flag, having gained third place in the production of ships for that month. The flag, a white one, was raised at noon September 13, Miss Lillian Sullivan, day nurse at the emergency hospital, being the one selected to hoist it aloft. The Grant Smith-Porter plant retained second place among wooden yards.

In the flag distribution of the Shipping Board for the plants engaged in 100 per cent ship construction work for the government, the Motorship Construction Company, of Vancouver, gained a pennant, which was hauled aloft September 14 with appropriate exercises.

Under an arrangement with the Commissioner of Public Docks, the Willamette Iron & Steel Works has obtained space at the head of the slip at the Fifteenth-street terminal, where a restaurant and recreation hall is being erected. The plant management will provide facilities for seating 700 men and the establishment is to be directed by an experienced steward. There is to be no profits, the plan being to provide edibles at cost.

G. B. Hegardt, chief engineer of the Commission of Public Docks, was named by the Commission to represent the city at the annual meeting

of the Association of American Port Authorities, at Philadelphia, and he departed September 14.

Women employees of the Foundation Company, banded in the Carry On Club, and who furnished funds for the adoption of 20 Belgian orphans, one for each French ship contracted for, have been advised by the Stars and Stripes, the American Army paper abroad, that they stood second in the matter of contributions of all organizations in the United States. The first place was won by the auxiliary of an Illinois regiment.

Portlanders are all agog on the receipt of an official report that the tank steamer Frank H. Buck, now commandeered and which was built at San Francisco for the Associated Oil Company, had sent a German submarine to the bottom 400 miles off Sandy Hook September 3, because aboard the Buck was Captain G. B. MacDonald, for 30 years on the Pacific Coast, the last 10 years of which he sailed between the Columbia River and California ports principally. He is now in the Navy Reserve Force with the rank of commander.

J. W. Hall, assistant supervisor of wooden ship construction in the Oregon District, is at Philadelphia, presenting to experts of the Emergency Fleet Corporation plans drawn here for a 5000-ton all wood steamer. The vessel is designed along the general lines of the Ferris type, but strengthened in every way possible. Should the design be adopted no changes would be necessary in the Oregon yards to lay down the vessel.

So acute has been the shortage of laborers in wooden yards that the G. M. Standifer Construction Corporation has invited business and professional men to work on the first night shifts, helping rush vessels as well as earn a few extra dollars each day. There has been a limited response.

Turning from commandeering ocean greyhounds and others of the big class, Uncle Sam has officially taken over the little gasoline schooners Roamer and E. L. Smith, plying between Portland and Yaquina Bay. They will be continued on the route but will devote their capacity first to the needs of the spruce division camps, taking public freight when space permits.

Ushering in the first week in September 85 inspectors of the Emergency Fleet Corporation force met with Oregon executives of the body and discussed details of their work and experiences with builders and various features of plans and specifications. It was the third gathering since the district was formed and proved most beneficial. The meeting adjourned late in the afternoon, the delegates going to the Multnomah Hotel for dinner and being joined there by the entire Emergency Fleet office staff.

A BRITISH COLUMBIAN MERGER

Portland, Seattle, Vancouver and Victoria joined hands September 9 in celebrating at the latter city the entree of the Foundation Company, Ltd., of British Columbia, into the actual management of wood shipbuilding establishments. The afternoon was declared a holiday and thousands attended a parade and the launching of the War Nanoose, the last of five steamers for the British Munitions Board, also the laying of keels for two of the twenty French steamers the Foundation Company is to build.

Premier Oliver, of the Province of British Columbia; J. J. Hart, Minister of Finance; Mayor



Interior view in the new plate shop at the Columbia River Shipbuilding Corporation's Portland shipyard

Reed, of Victoria; Captain Hirsch, of the French artillery and an instructor at Camp Lewis; Bayley Hipkins, vice president of the Foundation Company in America; Scott Calhoun, of Seattle, counsel for the company; Jack Haviside, of San Francisco, of the firm of Haviside, Withers and Davis; Captain E. C. Genereaux, of Portland, French representative at the Foundation yard, were there either to participate in the exercises or as special guests. The Foundation Company's band had been sent from Portland for the affair and the music was said to be the best Victorians had heard in their home city, a tribute being paid the musicians by Premier Oliver in a letter to the company later. Recognition was also accorded the band by the Victoria Board of Trade in the form of a banquet at the Hotel Empress and an automobile tour of the city Tuesday morning.

The Foundation Company had built the five ships for the British Munitions Board, but on a cost plus basis and with the government plant. On arrangements being finished for launching the last ship the Foundation interests acquired control of the plant and the adjoining yard of the Cameron-Genoa organization, merging them so as to give eight ways under one direction. The closing of a contract with the French for 20 wooden steamers followed and now the new properties are in full swing, experienced men being drawn from the

Tacoma and Portland plants to assist in getting the large organization under way and Mr. Hipkins is satisfied the men there will give Portland and Tacoma a close run, though having only eight instead of 10 ways.

COLUMBIA RIVER SHIPBUILDING CORPORATION'S EXPANSION

Final labors September 15 on Ways No. 4 and 5 gave the Columbia River Shipbuilding Corporation facilities for laying down steel vessels that are estimated to insure the launching of a hull about every 20 days. A call has gone out for the employment of 2800 men of unskilled types to be added to the present force of 3200 workers and by January 1 it is planned to have the expanded facilities working to capacity in harmony with those that have been kept going since the Corporation undertook ship construction.

In a measure the Columbia River Shipbuilding Corporation won a distinction over several other Northwest plants regarding new equipment, for when Emergency Fleet Corporation executives visited the Coast in July Director General Schwab and Vice President Piez accorded the construction of the two ways, a second plate shop and blacksmith shop, with needed appurtenances their final approval, rating them as necessary in the promulgation of the war program. On the other hand,



The new blacksmith shop, a part of the Columbia River Shipbuilding Corporation expansion program

other yards in the Oregon and Washington zone were denied authority to extend boundaries and their equipment on the score of limited man power being available and a somewhat indefinite future as to greater steel production. One case in point here was that of the Northwest Steel Company, which was to have duplicated its plant, but a conference between the company and government officials brought about a decision to forego the project for the time.

To date the Columbia River force has to its credit the delivery of more than one completed ship each month during 1918. Of the total of 32 vessels of the 8800-ton design, that represents those sent away as well as under construction and contracted for, nine have been turned over to the government.

New names assigned vessels there, for Hulls No. 11 to 32, are as follows: West Cobalt, West Waukeke, West Imboden, West Munham, West Tolant, West Quechee, West Nosska, West Harchvar, West Hardaway, West Hargrove, West Harlan, West Harma, West Harqua Hala, West Harshaw, West Harts, West Hartland, West Hartley, West Hassam, West Hassayampa, West Hastain, West Haswell and West Carun.

WOODEN SHIPS FOR GRAIN CARGOES

Recognition of wooden steamers as grain and flour carriers, to be pressed into service on the Pacific side to relieve congestion of railroads in moving by water foodstuffs that have largely been routed overland so far this season, was made about the middle of the month by the Shipping Board in ordering that about 10 cargoes be tried, they to be loaded on the Willamette and Columbia Rivers and on Puget Sound.

Max H. Houser, in charge in the Northwest for the Food Administration Grain Corporation, an influential grain exporter in times of peace and who is now devoting all energies toward the assembling and dispatch of wheat as well as the manufacture of flour for the government, is a firm believer in wooden vessels for grain transportation between the Pacific and Atlantic Coasts. He has an argument in rebuttal for every objection raised that the newness of wooden ships, the use of creosote on certain timbers and the odor of pitch and tar, might be absorbed and retained by the cargoes. In short, with tonnage available and having proven of late, when wheat was brought from Australia in wooden "fore and afters" that it can be carried long distances in such vessels without injury, he advocated the utilization of the ships being fitted out in the Northwest and won his point.

In the Oregon District alone Mr. Houser conservatively estimates that he will have 10 to 12 cargoes afloat or started before October ends and with his experience in shipping cereals and the personal assurance to the Washington, D. C., authorities that he has no doubts about the success of the undertaking, it has met with their approval. Yet, as indicated in dispatches from the capital, the movement is characterized as experimental. Oregon builders of wood ships are with Mr. Houser and are pleased that the opening has been afforded to prove the worth of steamers built of home material and with home talent to carry home products.

OREGON WOOD SHIPBUILDERS' ASSOCIATION

"For the promotion of the wood shipbuilding industry of the Pacific Northwest" is a leading purpose embraced with others in the ends sought by the Oregon Wood Shipbuilders' Association, formed last month by builders of Portland, Vancouver, St. Helens, Columbia City, Astoria, Tillamook and Coos Bay and with strong probability that Grays Harbor will join in the association.

At the outset 16 organizations hold representation in the membership and each is engaged now in construction on behalf of the Emergency Fleet Corporation. It has been felt that more concerted action among wood shipbuilders, rather than being identified only with societies that embraced both wood and steel, was desirable, for it is realized that with the completion of vessels at such a rate as at present there will be many matters arising of general concern to the industry and preparations should be undertaken also for the future of the plants.

F. C. Knapp, head of the Peninsula Shipbuilding Company, is president of the Association; E. W. Wright, general manager of the McEachern plant, is vice president; Eric V. Hauser, general manager of the Grant Smith-Porter Ship Company, is treasurer, and George C. W. Low, treasurer and principal owner of the Supple-Ballin Shipbuilding Corporation, is secretary. The officers are also directors and, with Charles F. Swigert, vice president and general manager of the G. M. Standifer Construction Corporation, make up the full board of directors.

Quarters have been opened at room 302, in the Northwestern National Bank building, where are also located the offices of the Emergency Fleet Corporation, those of the American Bureau of Shipping and other agencies having to do with maritime matters.

MIDNIGHT LAUNCHINGS

To get the best of the proverbial "hoodoo" of Friday, the 13th, the Grant Smith-Porter Ship Company and the Foundation Company managed to launch vessels 20 minutes and 30 minutes, respectively, after September 14 had been ushered in, wafting away the stigma of superstition by the explanation that just after midnight tide conditions were most favorable for the debut of the new carriers.

At the Grant Smith-Porter plant the hull of the Ferris steamer Kokoma was floated at 12:20 a. m., Mrs. T. Turnbull, wife of the night superintendent, being godmother for the vessel. At 12:30 a. m., Mrs. George L. Baker, wife of Mayor Baker, of Portland, started the French steam auxiliary schooner Nancy riverward to the stirring strains of "The Marseilles," for, regardless of the unusual hour, the Foundation Company's crack band was on duty and Director Cioffi's men played with the same precision and feeling as characterized their appearance early in the week at Victoria, B. C., where they were accorded an ovation.

The Kokoma was the twentieth ship the Grant Smith-Porter organization had launched since February 17. The Nancy was No. 14 for the Foundation Company's Portland plant since March 20. The former has delivered 12 of the vessels and the latter yard 10.

Table showing least depths in ship channel at low water and average increases due to tidal effects on Columbia and Willamette Rivers from Portland to Astoria, Oregon. From records of Corps of Engineers, U. S. A.

Stations and locations of dredge channels	Distance in miles from Astoria	depth at dredge channels Mar. 1, 1918	Average increase of depths at dredge channels for low stage of river at high and low tide		Mean delay in time of tide in hours and minutes after predicted time at Astoria during low water stage of river	
			High Tide Ft.	Low Tide Ft.	High Tide	Low Tide
Astoria	0	30				
Elliott Point	13½	30	6.9	1.8	0:55	1:20
Puget Island	25	30	6.2	1.7	1:35	2:15
Coffee Island	28½	31	6.0	1.7	1:45	2:35
Eagle Cliff	37	26	5.5	1.6	2:10	3:15
Walker Island	47	30	4.8	1.5	2:45	4:05
Slaughters	51	30	4.6	1.5	3:00	4:25
Dobelbower	56	30	4.4	1.5	3:20	5:00
Hunter Bar	62	30	4.2	1.5	3:45	5:20
Martin's Island	66	28	4.0	1.4	4:00	5:40
St. Helen's Bar	72	30	3.6	1.4	4:30	6:10
Henrice	76½	30	3.3	1.4	4:50	6:35
Willow Bar	82	30	3.0	1.4	5:15	7:05
Mouth of Willamette	88	30	2.7	1.3	5:40	7:45
Linnton (Postoffice Bar)	90	30	2.6	1.3	6:05	8:05
Portland	100					

WITH WARREN TRANSPORTATION COMPANY

Mr. Charles Skentelbery, who has been well known in the steamship business on this Coast since 1901, and as marine superintendent of the New England Fuel & Transportation Company, Boston, Mass., for the past eleven years, has resigned this position in that company and has associated himself with the Warren Transportation Company, 35 Congress street, Boston, Mass., as general manager.

This company, whose president is Mr. George E. Warren; vice-president, Mr. George P. Oswald, and treasurer, Mr. George W. Anderson, who are well known in connection with the Warren Transportation Company and the George E. Warren

Company, will conduct a general steamship business in both foreign and coastwise trades.

J. F. Brown, superintendent of construction of the East Waterway Dock and Warehouse Company, a subsidiary company of Rogers, Brown & Company, has recently returned from a short business trip to Chicago and Eastern points. While in the East, Mr. Brown was looking after the construction and maintenance of equipment owned by the Chicago branch.

Mr. Brown has been affiliated with Rogers, Brown & Company for the past two years and was largely responsible for the successful installation of the new pipe lines which are proving so successful in handling Oriental oil at the big Harbor Island oil terminal.



The entrance to one of the several canals on the upper Columbia. These water-borne commerce projects will have a marked effect on river commerce on the Columbia as the back country develops

The Past Month in Tacoma

By Special Correspondent

GREATER interest in port development is being shown by the business interests here at present than possibly at any other time in the history of the city. That Tacoma has been seriously lagging is admitted by every one connected with the harbor work, but it is believed now that by interesting the county, city and possibly the government in additional shipping facilities that some good may be accomplished.

At present a committee from the city, one from the Central Labor Council and one from the Commercial club, are meeting to devise ways and means for building new docks or interesting shipping firms with a view to placing new docks here. At the present time the port is receiving practically the overflow from other ports of the Sound which are so congested that they are unable to handle the freight offering. The question at present hinges as to whether conditions could be improved by a port commission or through an arrangement of utility bonds handled by the city. It is believed that within the next few weeks some definite scheme will be decided upon, and with the backing of the united working force of Tacoma and Pierce county put through.

The Osaka Shosen Kaisha steamship "Canada Maru", which went ashore while inbound from the Orient just south of Cape Flattery, has been taken from here to Esquimalt, where she will be repaired. It is estimated that from six to eight weeks will be required for placing the ship in condition again.

Work on new tanks being put up here by the Philippine Vegetable Oil Company is expected to be finished this month. The company will have facilities for storing some 2000 tons of oil.

The Anacortes, launched at the Todd Drydock & Construction Corporation yard, July 4, went on her trial runs September 5. It is expected that several other vessels put out at this plant will be ready for commission within a short time.

The Beloit, put out by the Tacoma Shipbuilding Company and the first vessel launched at these yards, underwent trial runs the first of the month. The machinery was installed in the vessel by the Charles Moore Company, who have the work of installing the machinery in all of the vessels put out by the Tacoma Shipbuilding Company.

President George P. Wright, of the Wright Shipbuilding Company, has returned from the conference held in Philadelphia by the different heads of Pacific Coast yards and the Emergency Shipping Corporation. This yard was recently granted further contracts for wooden ships and will probably have larger type vessels than the Ferris ships to construct if the Government decides on greater wooden carriers.

One of the first cargoes of copra to be received here in some months recently arrived, consigned to

the American Trading Company. This cargo came direct from the Fiji Islands. According to Capt. Laurintzer of the vessel, a number of well-known Pacific Coast sailors are loading copra.

Carl S. Holmes, who has been assistant secretary-treasurer of the Todd Drydock & Construction Corporation yards since active work was commenced upon the plant here, has left the company. Just what work Mr. Holmes will take up he states has not been fully decided upon. Mr. Holmes sent in his resignation last spring, but it was not acted upon for several months, and then he was requested to wait until September 1 when his successor could be named.

Mr. Holmes was succeeded by Edward Nugent, of Seattle, with W. H. Kent, for a number of years with the old Seattle Drydock & Construction Company, as treasurer, with headquarters in Seattle. At the recent election of officers of the company, held in New York, President C. W. Wiley was re-elected, with James S. Milne, of New York, vice-president, and Carl R. Riedel, of New York, assistant secretary and treasurer, with headquarters in New York.

The passenger steamer Tyrus, built here in 1904 by the Lorenz Brothers, has been sold by them to the West Pass Transportation Company, and will be operated between Tacoma and Seattle, via the East Pass route, both in freight and passenger trade. The new owners have been running boats on the West Pass route for several years.

President H. F. Alexander, of the Pacific Steamship Company, left for the East September 1, expecting to be away for a month. He went by way of San Francisco.

Lumber business from Tacoma to West Coast ports continues fairly active, according to local shipping men. Much of the business is handled by vessels of the Grace line. It is expected, with the completion of vessels here for the Shipping Board, that the cargo movement to Peru and Chile will be greatly improved.

So far the Tacoma yards have put out thirty wood and steel ships since the United States entered the war. The first launch took place on February 9, this year, and it is expected that September will show several launches which will run the total up. Among the last ships to go into the water was the Democratic, August 20, and Fraternite, August 31, from the Foundation yards, No. 4. These are auxiliary vessels. The last Ferris type ship went in from the Seaborn yards August 12. This was the Wakana. The Cheron, from the Seaborn yards; Anacortes, from the Todd, and Beloit, from the Tacoma, and Nahaska, from the Babare yards, have been accepted by the Government within the past few days.



The Far Eastern Situation

GERMANY has been buoyed up by the conceit that after the war she will be allowed to enter the markets of the Allies practically on the same footing as in pre-war days simply because the Allies cannot do without her trade. That belief has been firmly established in the German mind. Even amongst the Allies there has been the opinion that Germany would be allowed to enter the markets of the Allies again soon after the cessation of hostilities. In previous wars Britain has treated with her enemies on the supposition that after hostilities are over enmity must cease, and it must be confessed that for a time it looked as if political influences would at the last work towards a situation under which Germany would not be shut out from our markets. But when that doubt was hovering round those who wanted to see Germany getting her deserts found consolation in the fact that it was not British interests alone that would have to be taken into consideration when peace negotiations were in progress. France, who had suffered so much, was not likely to agree to anything that would allow the enemy to regain her former position and again become a menace to the peace of the world. Now that America has entered she too will want to see that the power of the Hun to penetrate commercially into Allied markets is restricted.

But it is good to see signs in Britain that the most complete restrictions will be placed against Germany trading in Britain and British dependencies. The Seamen's Union are determined that no German ship shall be manned by British seamen, and that cargo carried in a German ship will not be handled at a British port, for a period to depend on the length of the period during which German submarines continue to sink the mercantile marine of the Allies. That is an excellent sign. It shows that there is little hope of the German dream of the *status quo ante-bellum* being realized.

A German professor has written recently to show the disastrous consequences that will accrue to Germany if she is shut off from her international activities after the war. He argues that even if Germany were in a position to develop her trade with her Allies she would sink into the position of a second rate power if she were unable to gain her overseas trade.

Is there a danger of her gaining that trade? I do not think so. If she had fought with clean hands there can be little doubt that after the war she would have been allowed to trade again in the overseas market of the Allies. Her doctrine has been that in war it is force that counts and that she is at liberty to pursue any methods that

will ensure for her victory. I have even heard it argued by neutrals that Germany was quite justified in pursuing the policy of blood and iron inasmuch as it would spell the more speedy conclusion of the war. We will say nothing about the moral aspect of this argument. To enter on such a policy means that you are facing a terrible price if you fail. Germany has set the world against her. Yet she has failed to win the war. She will have to pay the price, and there is no use of fools and traitors amongst the Allies whining that we should not be too hard on our defeated enemy; in other words, that we should not exact too great a retribution from her. Germany took her chance, and she must suffer.

We will take a small instance of one of the directions in which she is to suffer. In the Straits of F. M. S. before the war she held a large part of the trade. She won it by fair and unfair means. She fought Britain in her own markets, and she was well on the way to beat her when the war came. She won her position by meeting the bazaar, by underselling and by giving longer credits than the British merchant was prepared to give. It was not sound trading on her part as the books of enemy firms have shown since they were taken over by official liquidators. But there was official backing to this commercial penetration. It was the German merchants, plus their government, against the British merchants. In the unequal fight Germany was winning, and when the war broke out she was taking from Britain a large part of her trade.

Now, is it to be supposed that after the war the British merchant is to welcome back the German merchant? In the first place, the former is too glad to be rid of the menace of the latter. The German came bouncing in and upset the commercial system of the country. With his extravagant credits he created a condition of chaos, which it has taken the British merchant a considerable time to adjust. If the German were admitted to our midst again he would at once commence operations on the lines he followed before the war, plus the new tricks he may have learned during the war. He would upset the commercial situation, and he would rush in with his goods at ridiculously low prices and sweep the market. On business grounds alone the British merchant would strongly oppose any attempt to allow the German to return on the old terms. But apart from that it is not conceivable that there is any member of an Allied nation who would agree to allow to the barbarians of the world a freedom that would have a detrimental effect on the development of civilization.

It is hard to conceive any member of an Allied nation again trading with a Hun.

As far as Great Britain is concerned it is to be supposed that the policy followed in a territory such as this will be largely influenced by what is done by the imperial government. But whatever the policy, it is to be assumed that the German will be barred from entering these markets for a period of years after the declaration of peace. There has been the suggestion that a tax be placed on enemy goods entering the country, but we doubt if even this would suffice. The German would find some way to circumvent the tax, or if he could not circumvent it he would be prepared to sell at a loss in order to be able to compete, and even undersell, the merchants of other countries. So that the only safe course appears to be to completely debar an enemy trading in the country, and to prevent any Allied merchant dealing

in enemy goods in this country. Before the war many German agencies were held by British firms. There was nothing wrong in that then, but it should be impossible for a British firm again to handle enemy goods till at least the lapse of ten years after the declaration of peace. Ten years does not seem to be an unduly long period, and if some such policy were adopted by all the Allies Germany would realize that war does not pay.

This is a free port, and there would be strong opposition to the erection of an import tariff. But it may have to come. If it does it is certain that the tax on goods imported from neutral countries will be higher than goods imported from countries that took part in the war on the side of civilization. It is just possible that goods from Allied countries will receive exactly the same treatment as goods from Britain.

Import and Export News

DERNHAM BROTHERS, exporting and importing American, Oriental and Philippine goods at Manila and elsewhere for the past eighteen years, have opened a ground floor office at No. 10 California street, San Francisco.

The War Trade Board, in a new ruling (W. T. B. R. 220), has adopted certain restrictions on deck cargoes on unarmed vessels, proceeding without convoy from Atlantic and Gulf ports. The War Trade Board also announces certain restrictions on cargoes carried by sailing vessels. In order to avoid delays and unnecessary expense, vessel owners, charterers and agents should consult with collectors of customs or agents of the Bureau of Transportation, War Trade Board, before making commitments for deck cargoes or cargoes to be carried by sailing vessels.

The budget for 1919 introduced to the National Congress of Argentina proposes increases of 20% in the official valuation of imported goods, 50% in the statistical tax and 33 1/3% in the port dues. It is also proposed to impose an income tax which may affect American interests. The proposed valuation increase is equivalent to a general increase of 20% in the import duties on all goods and the raise in port dues will form a considerable item in the cost of importing goods as these dues were raised 50% already in February of this year.

Under date of July 10, Consul A. E. Carleton of Hongkong, in writing of marine motor opportunities in his territory in Commerce Reports states:

The greater development of the American trade in marine engines of all types in Hongkong and the territory tributary to it is a matter of educational propaganda. The economic value of motor boats must be fully demonstrated to the Chinese and a motor must be produced that is reliable, simple to operate, and not too expensive. High finish is of secondary importance to reliability.

The need of educational propaganda is best evidenced by the experience of a local firm, which some years ago endeavored to interest the fishing-junk people to install motors. A number of these fishermen were much impressed with the idea and

went so far as to order a few motors, but at the last moment canceled the order, giving as their reason that it would result in "bad joss" since their fathers had never used motor power on their fishing junks. It is, therefore, this superstition, if it can be called that, which must be overcome before this type of junks can be fitted with motors. But the Chinese are utilitarians above all things, and there is reason to believe that success, or reasonable success, might be obtained if there were introduced on this market a motor that is (1) very cheap in first cost, (2) so simple to operate that a person with no mechanical knowledge can operate it after receiving a little instruction, (3) capable of withstanding abuse, and (4) not dependent upon magneto or batteries for ignition.

Edward L. Partland, of E. L. Partland and Company, San Francisco, who recently returned from an extended business trip to the Orient, laid special stress on the matter of proper packings for export goods.

Partland said that plenty of stout boxes, nails and metal strips would insure the arrival of American merchandise in good condition. The use of cardboard containers is now discouraged, and as a result goods are arriving offshore in good condition. The Matson Navigation Company recently notified shippers that no goods will be accepted for foreign shipment that had not been properly packed. This example is now being followed by other steamship concerns, and as a result the insurance companies are being called upon to make adjustments less frequently.

The War Trade Board announces that a general import license known as P. B. F. No. 26 has been issued covering the importation of surplus ships stores and supplies, which the Bureau of Transportation of the War Trade Board may order to be removed from vessels in United States ports.

By a new ruling of the War Trade Board (W. T. B. R. 222) all outstanding licenses for the importation of mahogany logs and mahogany lumber were revoked as to ocean shipment after September 10, 1918. No licenses are now being issued

for mahogany except to cover such shipments as the Director of Lumber of the War Industries Board shall certify to be suitable and necessary for Government use.

The text of the contract signed between the Government of Uruguay and the U. S. Emergency Fleet Corporation for the charter of the German steamers seized in Uruguayan ports (Wiegand, Thuringia, Bahia, Salatis, Polynesia, Mera, Silvia and Harzburg, aggregating 60,600 tons dw.) has been published in Montevideo. The charter rate is \$8.225 per ton dw. per month, half payable in Montevideo and half at New York at current rate of exchange. The charter runs from the day each ship is placed at disposal for loading for the duration of hostilities between the U. S. A. and Germany, with the option of prolongation of the charter for three months thereafter. All working, agency and supply expenses, and fire, marine and war risk insurance are to be paid by the charterers. Fire, marine and war risks are to be covered at the rate of £35 per gross register ton, as specified in Lloyd's Register Book, and policies are to be endorsed in favor of the Uruguayan Government. Preference in effecting insurance is to be given to the Uruguayan State Insurance Bank. The Sylvia, Weigand and Harzburg are to be employed in continuous service between the U. S. A. and Uruguay, and shall carry on southward voyages not more than 8,000 tons per month for account of bona fide Uruguayan Government concerns. On northward voyages Uruguayan cargo shall be carried and/or cargo from other South American Atlantic ports not south of Buenos Aires. The Polynesia, Salatis and Thuringia are to be placed in service between Uruguay and English or French Atlantic ports. The Bahia and Mera will be placed in service between Uruguay and French and English Atlantic via a U. S. Atlantic port when northward bound, and direct from Europe to Montevideo when southward bound. The cost of repairs is for



John J. Gorman, General Oriental Agent, Pacific Steamship Company

account of lessors, but the charterers pay the original cost of putting the ships in seaworthy condition. Profits from salvage are to be shared equally. The vessels will sail under the flag of the lessees or sub-lessees, who may also change the names. Power is taken for four of the four vessels to be leased to a company to be indicated by the British Government.

New Foreign Agents Appointed

AN important announcement of further extensions of the Pacific Steamship Company's organization in the Orient was made recently by General Manager A. F. Haines. An increase in the company's personal representatives in the Far East, as well as an addition in the number of ships on the Puget Sound-Oriental route, are involved in the plans.

The extensions include the establishment of the company's own offices in Hongkong, Yokohama, Kobe, Manila, Singapore, Vladivostok and other ports.

John J. Gorman, for many years with Dodwell & Company in Seattle, and one of the best informed foreign trade experts on the Coast, has been appointed to be general agent in entire charge of operations and traffic in the Orient, with headquarters at Hongkong. He will relieve H. K. Laidlaw, who has been the Pacific Steamship Company's personal representative in the Orient during the last six months. Laidlaw will return to the company's Seattle office.

Hugh Gallagher, a well known representative of

the company, has left Seattle for New York to relieve R. D. Pinneo as general Eastern agent. Pinneo, who was formerly foreign freight agent, will return to Seattle, immediately, and thence proceed with Gorman to the Orient to increase the number and co-ordinate the company's chain of offices. They will sail in October.

In several ports where other companies have been acting as agents for the Pacific Steamship Company, the latter will establish its own offices, thus giving it a complete personal representation in the Orient. Gorman will take with him to Hongkong a complete office force from Seattle.

Haines also announced that E. E. Johnson, general foreign freight agent at Seattle, will leave for the Orient in a short time to renew old acquaintances in the Far East and familiarize himself with current trade conditions.

The Pacific Steamship Company now has three vessels operating in the freight and passenger business to the Orient—the Senator, Admiral Mayo, and Admiral Sims. Haines stated that at least



Hugh Gallagher, General Eastern Agent, Pacific Steamship Company

three other vessels would be added as soon as they could be obtained for this trade.

"Our off-shore activities," said Haines, "will not decrease our attention to the coastwise service. On the contrary, our operations between Alaska, Puget Sound and California ports will be improved as rapidly as conditions justify. We have the largest fleet flying the American flag on the Pacific, and it is our determination to do our part to help establish the American merchant marine on a big and permanent basis in the foreign trade. H. F. Alexander, president of our company, is now in New York, where he is taking up the details of our further development."

Gorman will join the forces of the Pacific Steamship Company on October 1. He is at present manager of the import and export department of Dodwell & Company of Seattle, with which firm he has been connected for twelve years. Previously he was Dodwell & Company's manager in Tacoma. He came to the Coast in 1904 from Fall River, Mass., and went to work on the Great Northern docks at the time that the Minnesota and Dakota were running to the Orient. Later he spent a year in Alaska with the Shakan Salmon Company and then returned to join Dodwell & Company, which was then operating the Blue Funnel Line. He worked his way up to the position of chief clerk and from there was promoted to the position of Tacoma manager.

In going to New York to become general Eastern agent, Gallagher is returning to familiar territory. He was raised and educated in the East, being a graduate of Georgetown University at Washington, D. C.

In 1907 he left New York for the Philippines, via the Suez Canal, making a tour of the world while on the way, which included the continents of Europe, Asia and Africa. In Manila he was nearly three years in charge of shipping and customs for the Standard Oil Company. During this period he paid several visits to China and Japan. In Manila he is still remembered as an expert polo player. He returned to the United States in 1910 to join the firm of Twohy Brothers. In 1914 he became Juneau agent for the Pacific Alaska Navigation Company, which subsequently was consolidated into the Pacific Steamship Company. He recently was appointed claim agent for the company. He is a son of Col. Hugh J. Gallagher, chief quartermaster of the United States Expeditionary Forces in Siberia.

Pinneo will spend several months in the Far East and then will return to Seattle. He was a member of the freight traffic staff of the old Pacific Coast Steamship Company for ten years. He came to Seattle from West Superior, Wis., in 1908, where he was in the transportation business on the Great Lakes. During the last few years he has concentrated his attention on the Oriental trade.

Johnson, who will also go to the Orient before long, is another member of the company's foreign trade staff, who has had extensive experience in the Orient. He was with the Wilson Line and other British steamship companies in the Far East for a number of years.

PAN AMERICAN COMMERCE

The total trade between the United States and the twenty Latin American countries showed during the fiscal year 1917-18 just closed the extraordinary increase of \$1,000,000,000 over that of 1913-14, the last fiscal year before the outbreak of the war. The United States exports to, and imports from, Latin America reached the immense total of \$1,750,000,000, in contrast to \$750,000,000 four years ago! The official records prove that nothing equal to this trade expansion has heretofore been known in the history of the world.

These and other remarkable facts are brought out in an analysis of the latest Department of Commerce figures made by John Barrett, Director General of the Pan American Union, given out today (Saturday, September 21, 1918). In a review emphasizing the present importance of Pan American commerce but cautioning against overconfidence, Director General Barrett further points out the following interesting and surprising figures as confirming the conclusion just stated: United States exports to Latin America grew from approximately \$280,000,000 in 1913-14 to \$720,000,000 in 1917-18, or 257 per cent.; United States imports from Latin America increased from \$470,000,000 to \$1,030,000,000, or 214 per cent.; the grand total of exports and imports advanced from \$750,000,000 to \$1,750,000,000 or 235 per cent.

The reports for individual countries are equally impressive. United States trade with Chile in the same period jumped from \$43,000,000 to \$205,000,000, or 375 per cent.; Argentina, from

\$90,000,000 to \$305,000,000, or 240 per cent.; Cuba from \$200,000,000 to \$500,000,000 or 150 per cent.; Mexico, from \$132,000,000 to \$248,000,000, or 90 per cent.; Brazil from \$130,000,000 to \$190,000,000, or 46 per cent.

These figures emphasize the vast importance and possibilities of Pan American commerce, but they must not encourage false hopes as to United States trade of the future. This exceptional growth is due largely to, first, the supplanting by the United States of the trade of the Central Allies; second, the caring by the United States for that portion of the trade of Great Britain, France, Belgium, Italy, and of Holland and other neutrals, for which they themselves, under war conditions, could not possibly provide; third, the heavy war demands of the United States and the Allies expressed through the United States for the raw products of Latin America, and the war demands of the latter for such manufactured products of the United States as were formerly obtained from Europe in considerable quantities.

WITH THE FEDERAL TRADE COMMISSION DURING AUGUST

A summary of the Commission's activities during the month of August, including a full list of complaints, orders and enemy patent licenses issued, institution of cost inquiries, statements of foreign trade combinations filed under the Webb Export Act, etc., prepared for the use of the Pacific Marine Review:

Commissioners Sitting: William B. Colver, chairman; John Franklin Fort; Victor Murdock.

Orders to Cease and Desist: (Use of lottery coupons)—C. D. Kenny Tea & Coffee Co., of Baltimore.

Complaints Alleging Unfair Trade Practices: (Resale price maintenance)—Enders Sales Co., N. Y. C.; Vortex Manufacturing Co., Chicago; Hoover Suction Sweeper Co., New Berlin, Ohio. (Commercial bribery)—Henry C. Goodman, Baltimore; Hart & Zugelder, N. Y. C.; Printers' Roller Co., N. Y. C.; American Printing Roller Co., of Chicago.

Cost of Production, Inquiries Instituted (Data for Confidential Use of the War Branches): (At request of War Industries Board)—Wood chemi-

cals; common brick (certain companies in Washington and Baltimore); gypsum and fiber board; woolen rags; towing charges of sand and gravel (Baltimore and Norfolk districts); cost of handling African and South American mahogany. (At request of Navy Department)—Dynamite and glycerine; brass and copper sheet, tubes and rods. (At request of War Department)—Asbestos. (At request of Food Administration)—Cooperage; flour jobbers' profits in St. Louis (by the Commission); men's collars.

Enemy Patent Licenses Issued by the Commission: (Firms licensed to use enemy-owned or controlled patents)—Splitdorf Electrical Co., Newark, N. J., magneto patents; E. C. Klipstein & Sons Co., N. Y. C., tanning process patents (2).

Applications for Enemy Patent Licenses Filed with Commission: National Aniline & Chemical Co., dye patent; Merck & Company, N. Y. C., "digitallis extract"; E. C. Klipstein & Sons Co., tanning process patents (2), (granted).

Applications for Use of Enemy Trademarks: Takamine Laboratory, Inc., N. Y. C., "Ichthyol," medicated soap, plasters and medicinal preparations, medicinal sulfonic acids and their salts; "Equinine" derivatives of cinchona alkaloids.

Statements of Foreign Trade Combinations Filed with Commission: William E. Peck & Co., N. Y. C.; Pearson Export Corporation, N. Y. C.; Four subsidiary companies of the General Electric Co., of Schenectady, N. Y.; Companhia General Electric do Brazil, Inc.; Cia General Electric Sudamericana, Inc.; South African General Electric Co.; Australian General Electric Co.; Franklin International Corp., N. Y. C.; Markt & Schaefer Co., N. Y. C.

Informal Applications for Complaints Either Dismissed or Ordered Prepared Into Formal Complaints: 56.

During the month the first appeal from a final order by the Commission was taken when Sears, Roebuck & Co., Chicago, formally petitioned the United States Circuit Court of Appeals for the Seventh Circuit to review the Commission's order requiring them to cease and desist from unfair and misleading advertising. The Commission has certified the record in the case to the court.

Firms to Which Webb Law Applies

THE Department of Commerce has been asked by different firms as to whether the provisions of the act of April 10, 1918, entitled "An Act to promote export trade, and for other purposes" (the Webb bill), applies to associations engaged in trade between our mainland and our overseas possessions, such as the Philippines, Porto Rico, Hawaii, Alaska, etc., or to associations engaged in import trade.

The solicitor of the department has given the following opinion on this question:

"Section 1 of the act referred to defines the term 'export trade' so as to make it applicable to trade between the States and territorial possessions of the United States on the one side and foreign countries on the other.

"Section 2, in effect, withdraws from the operation of the act of July 2, 1890 (26 Stat., 209), all associations engaged solely in export trade, provided that neither such export trade nor any agree-

ment or contract made in connection therewith shall operate as a restraint upon trade or to enhance or depress prices or to lessen competition in the United States with respect to commodities of the class exported by such associations, respectively. It is to be observed that this section does not withdraw from the operation of the act of July 2, 1890, associations which may be engaged in import trade as well as export trade.

"Section 3 exempts from the prohibitions of the act of October 15, 1914 (38 Stat., 730), forbidding one corporation from acquiring or owning stock or shares in another corporation, associations organized solely for and engaged solely in export trade 'unless the effect of such acquisitions or ownership may be to restrain trade or substantially lessen competition within the United States,' leaving associations organized for or engaged in import trade as well as in export trade still subject to the prohibitions of the act of October 15, 1914.

But it is to be observed that that act, by its terms, does not apply to the Philippine Islands.

"Section 4 makes the provisions of the Federal Trade Commission act of September 26, 1914 (38 Stat., 717), with respect to 'unfair methods of competition' apply to unfair methods of competition between competitors in export trades 'even though the acts constituting such unfair methods are done without the territorial jurisdiction of the United States.'

"The net practical effect of these four sections is to free all associations engaged in the 'export trades' as defined in section 1 and not engaged in the import trade from all statutory restraints which may interfere with their competition with those engaged in supplying the markets of the world outside the territorial jurisdiction of the United States but not from such statutory restraints as may af-

fect their domestic trade or their competition with domestic competitors in the foreign trade.

"Section 5 imposes certain obligations with respect to making reports to the Federal Trade Commission upon those associations which may be entitled to the benefits of sections 2 and 3, and provides that failure to discharge such obligations shall deprive the association so failing of the benefits of the said sections 2 and 3 and subject it to a fine.

"Replying specifically to the questions raised, I have the honor to advise that, in my opinion, the act of April 10, 1918, supra, does not apply to associations whose business may be confined to trade within the United States and its territorial possessions, such as the Philippines, Porto Rico, Hawaii and Alaska, nor to associations engaged in the import trade, whether also engaged in the export trade or not."

Government to Train Employment Managers

By Edward D. Jones, Professor of Commerce and Industries, University of Michigan

THE Government has found it necessary to enter the field of education on a large scale. War emergency courses in employment management, conducted by the Employment Management Division of the War Industries Board, under the auspices of five governmental departments, have been arranged for in nine universities to date. The outline of the courses of study was made by Captain Boyd Fisher, who has general supervision of the work.

These courses in employment management are designed to train men or women, who already have a basic experience of at least three years in industrial life and factory methods, and who have come in actual contact with shop problems. Employers of labor, particularly those having war contracts, are urged to suggest men or women from their own organizations as candidates for these courses. With the increasing tightening of the labor situation, it is absolutely essential that large plants have an efficient central employment department. If the government is to take upon itself the task of furnishing labor when called upon it is necessary that that labor be employed in the proper manner. In other words, each man should be hired to do the thing he is best fitted to do. In these days every man must count and there must be no square pegs in round holes. It has been thoroughly proved that an experienced employment manager, in charge of all hiring and firing, comes very near to solving the labor problem. Therefore it is up to the employer to place his house in order and make the best use of the men with which he is supplied.

The introduction of the employment manager into industry, and the standardization of the services of an employment department, is acknowledged to be one of the greatest movements now taking place in the manufacturing industry of the country.

Courses have been arranged for at Harvard, in co-operation with the Massachusetts Institute of

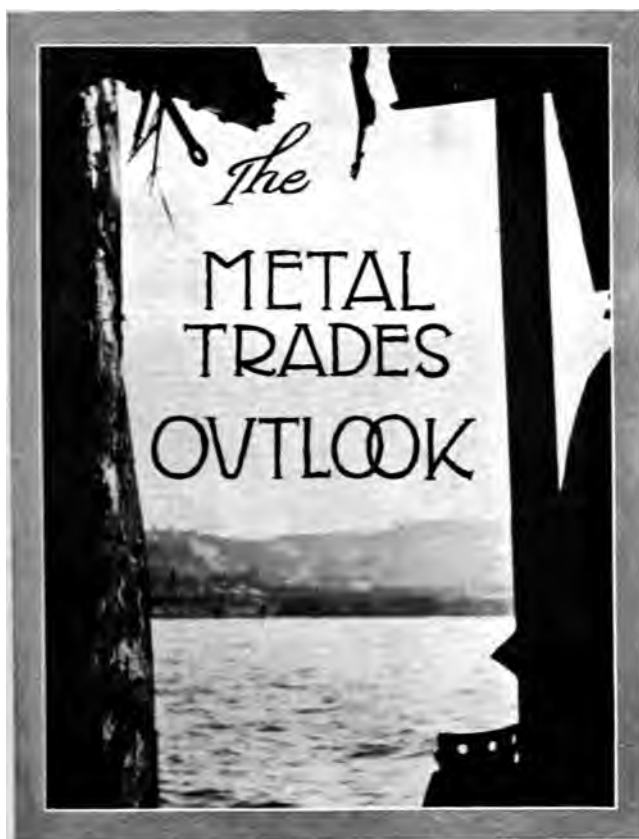
Technology, Boston University, in Boston; Columbia University, New York; University of Rochester, Rochester, N. Y.; Carnegie Institute of Technology, and the University of Pittsburg, Pittsburg, Pa.; University of Washington, Seattle; and the University of California at Berkeley.

There already have been 172 graduates from the classes conducted thus far. Most of these have returned to their own plants and placed in operation a department of employment. In each case where a central employment department is in vogue, there is never a thought of returning to the old-fashioned hit or miss method of hiring men.

The courses of instruction in the various schools run from six weeks to two months, and the classes are conducted by the foremost authorities in the country on the various subjects covered.

The course of study deals chiefly with the problems of employment management. Brief consideration is given, however, to statistics, labor economics, and business organization and management. The materials presented on the subject of employment management covers the organization and equipment of an employment department, the employing of the workers, the training of the workers, the payment of the workers, the control of working conditions, effects to keep the work up to standard, and the government of the shop. There are no charges for the course, except the outlay for living expenses of students and about \$15 for books and supplies. It has been arranged to begin new classes as soon as each previous class is graduated, so application for admission to the courses in any of the above-named schools may be made at any time.

Employers of labor having candidates for admission to the classes and individual applicants will be furnished with necessary information concerning qualifications for admission and other data regarding the courses by addressing Captain Boyd Fisher, 717 Thirteenth street, N. W., Washington, D. C.



BUSINESS in tin for the first five months of the present year in Hongkong was very brisk. On January first Hongkong stocks were about 1500 tons and the quantity imported from Yunnan for the six months is estimated at about 6,000 tons. America and Europe, mostly America, have taken about 6500 tons and China Coast ports and Japan about 850 tons. The price per picul in the middle of May was \$182 Mexican against \$103 Mexican at the beginning of the year. The declared exports of tin from Hongkong to the United States for the first six months' period of the past three years was as follows: 1916, 5,282,828 pounds valued at \$1,122,242; 1917, 9,112,931 pounds valued at \$3,035,986 and 1918 14,981,907 valued at \$9,528,228.

In order to undertake the construction of steel vessels up to 300 feet in length and especially the construction of large ocean-going steel tugs, John Wilson, a veteran shipbuilder of Seattle, acquired during September the five-acre plant of the National Steel Construction Company on the Duwamish waterway, Seattle.

Under the caption "To Increase Steel Exports" the American Economist questions the wisdom of heavy selling of steel at high prices to Oriental customers, as follows:

"In the Cincinnati Enquirer, on September 2, 'Holland' states that the United States Steel Corporation is starting a new campaign for foreign business, especially in the Orient. The undertaking, all things considered, seems somewhat peculiar; besides, we have an idea that it may have precisely the opposite effect that the United States Steel Corporation expects and desires. Conditions in Occidental countries have so completely changed

since the war began, especially in advanced cost of production, that it would seem to our simple mind that to compel our Oriental friends to pay the tremendously augmented prices for steel products that are now necessary in order to enable producers to earn a profit, will merely educate the Oriental to the possibilities of profit in producing the steel he needs at home, instead of buying it abroad.

"China, it is well known, possesses an abundance of all of the ingredients essential to the production of steel. Prices in the Orient have changed less than anywhere else, either in the matter of materials or of labor. This is precisely the time—when our prices are so tremendously inflated—that the Oriental has his opportunity to develop and make the most of his abundant but hitherto undeveloped resources.

Already Japan has realized what the possibilities are, and is making the most of the opportunity they present to her. Japan does not possess such an abundance of the raw materials necessary for steel manufacture as China does, but Japan has advanced much further in the making of steel than China has. This is a lesson that China is not likely to overlook, and the quickening influence of the lesson may come with the advent of the new steel selling propaganda that the United States Steel Corporation plans to conduct in the Orient.

"Our own judgment is that near markets for all of the steel that can be made in this country are available, and for a long time will be, without unnecessary and expensive propaganda, least of all in those parts of the world where conditions are so favorable for local production under comparatively prohibitive import price conditions."

The Chilean and Peruvian governments have recently placed orders for 100,000 tons of Pacific Coast coal which is to be carried in vessels built on the Coast and some of the Japanese boats recently turned over to the U. S. Government.

Hitherto much coal has gone forward from British Columbia and prior to the war regular shipments were sent from Newcastle, New South Wales. The absence of transportation from Australia has forced the trade to these shores and a regular and profitable business may be looked for, as tonnage is urgently required for raw materials. The only fly in the ointment appears to be a possible shortage of miners, but efforts are being made to overcome this difficulty which should not be an insuperable one in view of the fact that wages paid are the highest ever known.

SEMI-ANNUAL MEETING, A. G. M. A.

An interesting program was arranged for the semi-annual meeting of the American Gear Manufacturers' Association, held at the Onondago Hotel, Syracuse, New York, September 19, 20 and 21. A portion of the program was as follows:

"Priority," by Charles A. Otis, of the Priority Committee.

"What Is the Possibility of Women Becoming a Permanent Factor in the Gear Industry?" by W. H. Diefendorf.

"Trade Acceptances," by C. E. Crofoot.

"The Outlook of the Steel Supply," by C. E. Stuart, secretary and treasurer of the Central Steel Company, Massillon, Ohio.

"Pyrometers---Past, Present and Future"---In Relation to Heat Treating and Annealing

By Richard P. Brown,
President The Brown Instrument Company

(Continued from September issue)

It would seem that the greatest development work in temperature-measuring instruments will be done with the perfection of optical pyrometers. There is a field for a high-grade optical pyrometer which can be used by any number of operators, who will all secure the same results from the instrument.

Resistance thermometry will for some time continue to be limited to use at low temperatures unless some suitable metal is found for use in place of nickel to form the bulbs.

In thermo-electric pyrometry it is possible to develop better materials than those found to date for base metal thermo-couples. The insulation or protecting tube will be difficult to improve upon. With the direct reading millivoltmeter doubtless the resistance of these instruments will be greatly increased, and I know that we have spent an endless amount of development work the last year or two along this line, and other pyrometer manufacturers are doubtless doing the same thing. The more the internal resistance of the pyrometer can be increased, and at the same time maintain the robustness of the construction, the better the instrument.

With the potentiometer method of temperature measurement, doubtless development work can be carried on to advantage in producing an indicating instrument which will be direct reading throughout the scale range, and which will be simplified and less delicate than the types available at the present time.

I think, however, the greatest future in pyrometry is along the line of automatic temperature control. I have with me here an instrument which automatically controls the temperature of this electric furnace. By means of solenoid operated switches the circuit is opened and closed through the rheostat, maintaining the temperature constant within 10 degrees Fahr.

These instruments automatically maintain the temperature constant in an electrically heated oven, and this same type of instrument can just as easily be used on electric heat treating furnaces. We are experimenting with an instrument at present on an American gas furnace to operate gas valves and control the temperature automatically, and while this instrument is in satisfactory operation in our own plant, it is not developed to a point where it is ready for general use.

In connection with this instrument, which I have with me, to automatically control the temperature of this furnace, you will note that we have rigged up two lights which indicate whether the temperature is high or low. This same instrument could be placed at each furnace and indicate to the fireman whether the temperature was correct or not. We can place a neutral point, ten or twenty degrees in width between the two contact points, operating these lights, so that both lights would be out when the temperature was correct and the red or blue light would flash to indicate if the tem-

perature was too high or too low. We can also put a third contact in the instrument for this neutral point which will cause a white light to glow to indicate that the temperature is correct. It is much easier to instruct a fireman to keep the white light burning and the other lights out than to get him to maintain 1380 degrees on the pyrometer. He can see the lights from some distance, and these are easily understood by him. Unfortunately, the help that is available to operate furnaces at the present time is frequently unable to read a pyrometer scale. There as a number of pyrometer equipments installed at automobile plants, particularly where the operator signals from a central point by lights at the furnace whether the temperature is correct or not. This instrument will automatically signal with lights.

I think it is only a question of time when we will have completed our development work with a switching device which will permit of one instrument operating the signal lights at a number of furnaces. It is only necessary to introduce the additional switching mechanism.

AN ITALIAN VIEWPOINT

Discussing the prospects for the Italian shipbuilding industry after the war, the "Giornale d'Italia" comes to the conclusion that since Italy can hardly hope to compete with the big shipbuilding countries in the quantity of production, she must endeavor to rival them in quality. The old Italian shipbuilding yards, it says, which were extended immediately after the beginning of the war, will be able to turn out more than half a million tons of cargo boats per annum, and in two years they will be more than able to bring the Italian mercantile fleet up to its pre-war standard. In four years they will be able to double the size of the fleet, but that will be inferior to Italy's needs.

"But," the paper continues, "we are pigmies. There are the large constructors—England, Japan and last, not least, America, which in the matter of merchant ship construction was asleep, but is now awakened. England and Japan will be able to build between them 3,000,000 tons per annum, and America herself perhaps more, because she will build in series, as she produces the Ford cars. Then there are the smaller constructors, like Holland, Norway, France, etc., and finally Germany, who will build very rapidly.

"Hence, after peace, in a short time, in two or three years at the outside, the ravages of the submarine will be more than made good. Then will come a new crisis—a crisis of cargo vessels earning relatively low freights, although perhaps not so low as before the war.

"It seems strange to speak today of a crisis of cargo boats and low freights; it is to talk of abundance in a time of famine. But it is only logical and appears to be inevitable; because just

as the war has revealed powerful destructive forces, so peace will reveal equally powerful constructive forces. And then? What is to be done with our new shipbuilding yards? Are they to be abandoned? Not for a moment. Italy must prepare herself for solving the problem by means of quality, not quantity.

"We must not even think of competing with England and America in quantity of production. That would be absurd. We must equip our yards not only for cargo ships, but also for mixed vessels for carrying both cargo and passengers. It is a different form of construction, finer, and one

which demands more labor, and therefore one which is better suited for us.

"For this class of vessel there will be a great demand, because the war has also played havoc with passenger ships, especially for the transport of troops. And I do not see why, with this type of ship, fine, elegant, well planned, Italy cannot enter into competition even with England and America. It will be difficult, but I repeat, it is quality that we must conquer. Can it be denied that our automobiles of the Fiat quality are superior to the quantity of the Fords and Hupmobiles?"

Our New Merchant Marine

By Edward N. Hurley, Chairman, United States Shipping Board

TWO years ago we had no merchant marine worthy of the name engaged in overseas trade. The American flag flew over a total deadweight tonnage of 2,412,381 tons—but 80 per cent of this was coastwise and Great Lakes shipping.

The vast supplies which we were sending abroad were shipped under terms and conditions laid down by other nations, because the great bulk of our exports was carried in ships flying foreign flags.

We were a great tourist nation, but Americans traveled in foreign ships. We had very few ships going to South or to Central America; very few going to England, France, or Germany. We had still fewer going to Russia, Japan and China. There was just one line of old and comparatively slow ships crossing the Atlantic; one line crossing the Pacific; and a few lines to Central America and to the Caribbean countries; none to the west coast of South America; none to the east coast of South America; none to our cousins in Australia; none to India, and none to Africa. There were American tourists everywhere. There were also American products ready to go anywhere, but American ships nowhere. We could not serve the world as we should have served it, because we did not have the vehicles of trade.

Now we are beginning to fulfill our destiny. We have increased American-built tonnage to over 4,000,000 deadweight tons. We have added 118 German and Austrian vessels, requisitioned 86 vessels from the Dutch, and chartered 215 vessels from neutral countries, giving us a total of more than 1400 ships—a merchant fleet of 7,000,000 tons.

We have established a shipbuilding industry that will make us a great maritime nation. When the present program is finished we hope to have about 25,000,000 tons of shipping—3000 ships.

The United States Shipping Board is not only the greatest shipbuilder in the world, but is the greatest ship operator. If in 1919-20 we have the passenger and cargo tonnage we have planned, we will be in a position to establish a weekly passenger service between New York and Rio de Janeiro, Montevideo, Buenos Aires, and Caracas on the east coast, and weekly service between Colombia, Ecuador, Peru, and Valparaiso, Chile on the western coast. On the west coast we now have two fast passenger steamers plying between New York and Valparaiso. These are the first to carry the

American flag on the route. They have cut the time between these two important cities from 27 to 18 days—a saving of nine days.

Our Central American neighbors, Mexico, Guatemala, Nicaragua, Honduras and Costa Rica, must all have the very best passenger and cargo service, as must all of our South American neighbors. We have planned the class of steamers required for this service. The type will serve our Latin American friends in a manner that they have never been served before, but which they are entitled to. With the wonderful resources which these countries have, their products should be distributed in the world's markets, and they should have sufficient ships at their disposal and at rates that will enable them, when it is necessary, to sell their products in competition with other nations. This will give them an opportunity to receive their share of profits which will permit them to further develop their countries.

On the Pacific we must provide sufficient tonnage to meet Russia's requirements. The country has many products which we need. These articles can be moved in bottoms controlled by us at fair freight rates, and this will be most helpful to the expansion of Russia's trade.

China also has many commodities which we require, and should receive the transportation necessary to move them, not only to our country but to other countries to which she may desire to sell.

That progressive nation, Japan, is rapidly upbuilding her own merchant marine, but the demand for tonnage will be so great on the Pacific that Russia, China, Australia and other foreign countries will receive service which they have never been able to receive before.

What better use can we make of our merchant marine than to assure to other countries the best possible regular steamship service?

The new American mercantile marine will not only place "Old Glory" back upon the oceans but it will establish new trade routes for American commerce and play the role of protector to the commerce of other nations.

The nation has stood behind the United States Shipping Board in its tremendous task of shipbuilding. Now that the ships are being built, it is the duty of every American to stand behind our new mercantile marine.

These are the nation's ships.

They will increase the prosperity of the manufacturer, workman, farmer, miner and consumer.

They mean as much to people inland and farming States as to those along the seaboard and in industrial centers.

The American boy can again obey the call to the sea, serving in our merchant marine as a seaman, visiting foreign lands, and rising to command of his own ship.

Let us make our vast merchant fleet not only an

aid to national prosperity, but the greatest instrument of international probity, honesty, and square dealing. We will have the means as well as the desire to safeguard the nations of the world from selfish intrigue and sordid manipulation of the world's markets in the future. The great fleet we are building guarantees the achievement of this purpose.—Speech at University of Notre Dame, South Bend, Ind., June 10, 1918.

Westinghouse Marine Expansion

SO imperative have become the demands for marine propelling equipments for the Emergency Fleet Corporation that recently the new Essington Plant, South Philadelphia, of the Westinghouse Electric & Manufacturing Company has been placed in operation for the exclusive production of this equipment.

At present the Essington Works occupies a comparatively small part of the 500-acre tract, which provides for ultimate expansion, and contemplates an increase of three to four times its present capacity. Seventeen months ago the Essington Plant project was merely a carefully conceived plan on paper. Today it is a reality—an entirely completed plant in which millions have been invested to make it one of the most modern as well as the largest in the Philadelphia district.

At present the particular work at Essington is the production of complete propelling equipment for merchant vessels which are being built for the Emergency Fleet Corporation.

This enormous plant, devoted entirely to the production of Westinghouse geared turbine ship-propelling machinery, is sufficient for fifteen average vessels. In fact, the equipment embraces practically everything between the boiler plant and the propeller of the vessel.

The development of the Westinghouse reduction gear, begun by George Westinghouse in 1909 and his associates, the late Rear Admiral George W. Melville, formerly chief engineer of the United States Navy, and John H. McAlpine, a marine engineer of international experience, was the beginning of this epoch-making equipment in maritime circles. The Westinghouse floating frame reduction gear has made possible the use of the steam turbine with its high economics, thus permitting greater concentration of power for propulsion and making available more cargo space.

The difficulties in the design of a reduction gear for transmitting high powers at high speeds have been entirely overcome as a result of the scientific work of the late Mr. Westinghouse and his associates. Because of this the Westinghouse gear with its flexible frame is as reliable in operation as the Westinghouse air brake with the triple valve.

At the Essington Plant there are 350 complete marine propulsion equipments on order or under construction. The significance of these orders can better be appreciated when it is considered that they include steam turbines, reduction gears, condensers, condenser pumps, small turbine generator equipment for lighting, stern tubes, propeller shafting, propeller shaft bearings.

The largest equipment is 12,000 shaft horsepower and none are less than 1500 shaft horsepower.

Of the ships ordered prior to January 1, 1917, twenty-one are now in service, and their highly credible performance has proved the reliability and economy of geared turbine propulsion machinery.

The steam turbine-driven oil tankers, freight and passenger ships completed to date, most of which are now actively engaged in trans-Atlantic service, are listed below:

Name of Ship	Built at	Type of Ship	Shaft Horsepower
Malmanger	Chester, Pa.	Oil Tanker	2,900
Golaa	Chester, Pa.	Oil Tanker	2,900
Hisko	Chester, Pa.	Oil Tanker	2,900
Avondale	Chester, Pa.	Oil Tanker	2,900
Sudbury	Chester, Pa.	Freighter	2,300
Overbrook	Chester, Pa.	Oil Tanker	2,900
Coronado	Oakland, Cal.	Freighter	2,400
Yosemite	Oakland, Cal.	Freighter	2,400
Yellowstone	Oakland, Cal.	Freighter	2,400
Oakland	Oakland, Cal.	Freighter	2,900
Westerly	Seattle, Wash.	Freighter	2,500
Westwood	Seattle, Wash.	Freighter	2,500
West Eagle	Seattle, Wash.	Freighter	2,500
Maui	San Francisco, Cal.	Passenger and Freight	12,500
West Ford	Seattle, Wash.	Freighter	2,750
Accomac	Los Angeles, Cal.	Freighter	3,000
Polar Sea	Baltimore, Md.	Freighter	1,800
Wakulla	Los Angeles, Cal.	Freighter	3,000
Montrolite	Seattle, Wash.	Tanker	2,500
Wampum	Los Angeles, Cal.	Freighter	3,000
Wassiac	Los Angeles, Cal.	Freighter	3,000
West Galoc	Los Angeles, Cal.	Freighter	3,000
Phoenix	Chester, Pa.	Tanker	2,900

VISIT OF CHAS. R. PAGE

Mr. Charles R. Page, formerly General Auditor of the Fireman's Fund, and now a member of the United States Shipping Board and trustee of the Emergency Fleet Corporation, recently came to California from his post of duty at Washington for a much needed rest.

During his brief stay in San Francisco he renewed old friendships in the head office of the Fireman's Fund and noted with gratification the business progress of the Company. He also commented on the admirable way in which the ship-building yards of the west are contributing to the cause.

Mr. Page's fifteen years with the Marine Department of the Fireman's Fund and his recent trip to South America have both proved particularly valuable to him in his new duties on the Shipping Board. He will return to Washington this week.

The Bridge to France

Work of Eleventh District, Emergency Fleet Corporation

By Chester L. Florence

LET US THINK SHIPS

LET US TALK SHIPS

LET US BUILD SHIPS

ONE day last January a representative of a printing concern in Portland dropped into the office of the United States Shipping Board Emergency Fleet Corporation in the Northwestern Bank Building, soliciting business for his firm. After satisfactorily concluding his transaction and upon leaving the office, as an afterthought, he placed on the waiting room counter a small card bearing the words quoted at the head of this article.

From that time on the motto of District No. 11 of the United States Shipping Board Emergency Fleet Corporation has been the words printed on that card, and it is doubtful if to this day that salesman realizes to what achievements this afterthought has contributed, or the author, what inspiration those words have been in the building of ships in the Oregon and Columbia River District.

For those who may not be familiar with the purposes of the United States Shipping Board Emergency Fleet Corporation, or the reason for its existence, it might be well to briefly recite its aims and purposes.

Pursuant to the authority of the Federal Shipping Act of September 7th, 1916, a Board was created to be known as the United States Shipping Board, the members of which received their appointment direct by the President of the United States, acting under authority vested in him. The purposes of this Board are two-fold; first, in time of peace to promote the development of an American merchant marine and to regulate foreign and domestic shipping; second, due to the entry of the United States into this world wide war, by later legislation, it was given additional power of an emergency character to meet the manifold shipping problems confronting it. This board, after America's entry into this conflict on April 1, 1917, found that with its limited authority it could not handle to good advantage the many problems which arose and, acting under authority established by the Shipping Act, formed an emergency corporation and named it the "Emergency Fleet Corporation" for the purpose of purchasing, constructing, equipping, leasing, chartering, maintaining and operating merchant vessels in the commerce of the United States. The First Annual Report of the United States Shipping Board states that the purpose of this subsidiary corporation was to place vessels owned by it on a competitive equality with private shipping vessels. In other words, this would permit such vessels to be exempted from governmental restrictions which are not adapted to commercial practice, and would, on the other hand, withhold from them any special immunity in domestic or international law as is customarily associated with governmental activity. With the appearance of this corporation, there was given an unlimited power to build ships, same to be curtailed only by lack of appropriations.

After its organization, the United States Ship-

ping Board Emergency Fleet Corporation faced the greatest problem that in all probability has ever been encountered by any other corporation or concern—namely, that of building a vast fleet of vessels, not only to transport supplies and troops to our allies during the war, but to construct and put upon a working basis a merchant marine for the United States that would insure maritime supremacy after the war. This program called for not only the maximum production of ships in the yards already existing, but for the laying out and completion of new yards in the shortest possible time. The demand for steel for war work of other kinds, railroad congestion, lack of men skilled in shipyard construction, lack of machine shops, boiler works, foundries, fitting out berths, great cranes and other engineering devices, made this problem seem almost impossible. The promise was made that during the year 1918 there would be produced in this country eight times as many vessels as in the year 1916, and we are proud to say that, thanks to the initiative, patriotism and industry of the American people, this promise is not only being fulfilled, but is even being exceeded.

As an idea of what has been done in just eighteen months to the day since this program was started, the following data is interesting, compiled as of August 1st, 1918:

Number of Shipyards in the United States

Yards for steel ships.....	76
Yards for wood ships.....	86
Yards for composite ships.....	2
Yards for concrete ships.....	7
Total.....	171

Status of Completion of Above Shipyards

Shipyard plants practically completed.....	132
Shipyards from 50% to 100% completed.....	27
Shipyards less than about 50% completed.....	12
Total number of ways in the United States....	946
Total number of ways of E. F. Corporation....	846

From this it will be noted that a total of 946 ships can be constructed at one time in the United States for our merchant marine alone.

The two pictures accompanying this article graphically show what a transformation has been made of one individual property. One shows the beginning of a shipyard on July 9th, 1917, while the other shows the completed yard, with eight building ways, offices and other buildings on April 2nd, 1918, or nine months after. This second photograph, you will note, also shows eight-wooden vessels nearing completion at the time. ...

Owing to the large program demanded of the Emergency Fleet Corporation, and in order to facilitate the work of the corporation, it was found advisable to subdivide the United States into eleven districts, so selected as to geographically take care of every section of the United States engaged in the construction of vessels. These districts are merely subsidiary offices of the home



Lloyd J. Wentwerth, District Supervisor of District No. Eleven for the United States Shipping Board Emergency Fleet Corporation

office at Philadelphia, Pa., of the United States Shipping Board Emergency Fleet Corporation, and are required to report direct to the home office. Their purpose is merely to act as intermediary between the home office and the shipbuilders. Bear in mind that these districts do not actually build the ships, as this work rests upon the workers of the United States in the many shipbuilding plants and their thousands of allied industries. The corporation merely assists the shipbuilding companies in building good ships and building them in the shortest time possible. In inaugurating the system of districts, it was decided, and correctly so, that local conditions in the different parts of the United States made it necessary that final authority should rest with representatives who were thoroughly familiar with such local conditions.

District No. 11, of which this article is chiefly concerned, was formerly under the jurisdiction of District No. 8, with headquarters at Seattle, Washington, but owing to the vast amount of wooden construction on the Willamette and Columbia rivers, it was decided by the authorities of the Emergency Fleet Corporation to subdivide District No. 8, as far as wood shipbuilding was concerned, and thus on January 1st, 1918, District No. 11 was organized—to have complete supervision over the construction of wooden vessels on the Willamette and Columbia rivers, and including the shipyard at Tillamook, Oregon. The jurisdiction of District No. 11 is over wooden shipbuilding only, and is, with the exception of District No. 6, located at Houston, Texas, the only separate district of the organization of the Emergency Fleet Corporation which is devoted exclusively to the wood shipbuilding program.

At the time of organization of the Emergency Fleet Corporation on April 1st, 1917, there were only two shipbuilding plants in the district devoted to wood shipbuilding, with probably four buildings ways. Today there is a total of thirteen wood shipbuilding plants, and two installation plants, the latter devoted exclusively to outfitting vessels being built for this corporation. There are now fifty-six building ways, or an increase in eighteen months' time of eleven shipyard plants and fifty-two building ways. There has been com-

plied some general data as regards shipbuilding plants in District No. 11 which will more clearly set forth the rapid strides that have been made in shipyard plants to date, as given below.

From the employment of approximately two or three hundred men eighteen months ago in wood shipbuilding, there is now working at this occupation alone a total of 15,593 men. In connection with this wood ship program, numerous other industries have sprung into being, such as boiler shops; foundries, manufacturing concerns, etc., all dependent upon the shipbuilding industry. A close estimate, we believe, of the men engaged in these latter industries would equal that of the shipyard plants, or a grand total of over thirty thousand men in wood shipbuilding.

Since February 1st, 1918, the date of our first launching, this district has put into the water or launched a total of 61 wood vessels, or an aggregate of 209,800 tons, divided by months as follows:

Months	Number	Tonnage
February, 1918.....	4 vessels	15,700 tons
March, 1918.....	5 vessels	19,300 tons
April, 1918.....	9 vessels	33,500 tons
May, 1918.....	10 vessels	36,700 tons
June, 1918.....	3 vessels	10,500 tons
July, 1918.....	23 vessels	68,000 tons
August, 1918.....	7 vessels	26,100 tons
7 months	61 vessels	209,800 tons

While we consider the average of one vessel launched every three and one-third days very good—coming from shipyards that have heretofore not been experienced in work of this kind—at the same time, from this date on, we expect a decided increase in the launchings of vessels.

Following is a table of deliveries of complete vessels since June 24th, date of first delivery, to date of vessels ready for sea, by months and amount of tonnage:

June, 1918.....	3 vessels	7,000 tons
July, 1918.....	2 vessels	7,000 tons
August, 1918.....	9 vessels	32,500 tons
3 months	14 vessels	46,500 tons

Yard	Location	No. of Ways	Number Shifts Hull	No. Men Employed on Hull	No. of Shifts Machinery	Men Employed on Mach'y Installation	Total No. Men Employed
Coast Shipbuilding Co.....	Portland, Ore.	4	2	571	2	227	798
Kiernan & Kern*.....	Portland, Ore.	4	....	....	....	....	....
Supple-Ballin S. B. Corp.....	Portland, Ore.	4	1	554	1	94	648
Peninsula S. B. Co.....	Portland, Ore.	4	2	1261	1	161	1422
Grant Smith-Porter Co.....	Portland, Ore.	8	3	5702	2	367	6069
G. M. Standifer Const. Corp.....	No. Portland, Ore.	4	2	574	....	....	574
G. M. Standifer Const. Corp.....	Vancouver, Wn.	6	2	1702	2	39	1741
St. Helens S. B. Co.....	St. Helens, Ore.	3	1	314	1	9	323
Sommarstrom S. B. Co.....	Columbia City, Ore.	4	2	497	2	10	507
Geo. F. Rodgers & Co.....	Astoria, Ore.	4	1	574	1	10	584
Wilson Shipbuilding Co.....	Astoria, Ore.	4	1	835	1	21	856
McEachern Ship Co.....	Astoria, Ore.	6	2	1198	1	12	1210
Feeney & Bremer Co.....	Tillamook, Ore.	1	1	150	....	....	150
Pacific Marine Iron Works.....	Portland, Ore.	....	....	....	2	116	116
Astoria Marine Iron Works.....	Astoria, Ore.	....	....	....	2	595	595
Total.....		56	....	....	....	....	15,593

* Kiernan & Kern Company just awarded contract for vessels for Fleet Corporation, and have not yet commenced work.

During the month of September, District No. 11 will deliver approximately fourteen vessels ready for sea, or a total of 27 complete ships.

District No. 11 has also earned its full share of individual records. For instance, on April 20th, 1918, the Grant Smith-Porter Ship Company established a world record in wood ship launching when the "Wakan", a 3500 ton vessel of the Hough type, was launched. This vessel was built in 54 working days. However, later this record was broken by the Grant Smith-Porter Ship Company by launching a vessel in 49 working days, which at the time was considered a world record.

The Supple-Ballin Shipbuilding Corporation also has had its share of records. Two gangs of five men each planked complete a 310 foot hull, including garboard, 53 strakes of planking, in 27 days, which, it is claimed, was a world record.

The Grant Smith-Porter Ship Company wagered a bet of \$10,000 that it could put a vessel into the water in quicker time than any other shipyard in the United States. The G. M. Standifer Construction Corporation made a bet of \$10,000 that it could deliver a vessel complete, ready for sea, in quicker time than any other shipbuilding company in the United States. Regardless of the publicity given these wagers and the soliciting of takers by even the home office of the Emergency Fleet Corporation, there were no takers and the amounts deposited with the Fleet Corporation were subsequently returned to the shipbuilding companies.

In assisting Oregon to first go "over the top", the employes of the wood shipbuilding yards alone, during the Third Liberty Loan, subscribed a total of \$1,256,750. Each yard in the district oversubscribed its quota.

The Oregon district, or District No. 11, was the first district to establish a night school for shipbuilders, and this school at the present time is flourishing and adding to its membership daily. This practice is now one of the established features of the Emergency Fleet Corporation, schools having been established in practically every district.

The Supple-Ballin Shipbuilding Corporation set a new American record for wood ship construction when a crew at their third yard assembled and placed in position full framing for ship, total of eighty-nine, in forty and one-half hours.

The second wood ship, the "Wasco", built by the Grant Smith-Porter Ship Company, turned over to

the United States Government for operation, was a District No. 11 achievement. The first vessel delivered is credited to an Oregon yard, which, however, comes under District No. 8, at San Francisco.

The pennant contest, inaugurated by Director-General Schwab, has to date awarded all honors to the Pacific Coast. The June contest awarded first prize in wood ship construction to District No. 8, and the second prize to District No. 11. In this contest District No. 11 also won third, fourth, seventh, eighth and fourteenth places, out of a total of 86 yards. In other words, this district was in first division, with six of her yards out of thirteen in the district.

The success of District No. 11 is, of course,

rightly attributed to the shipworkers themselves, but credit must also be given to those who govern the work, for without intelligent, just and correct supervision, no amount of labor could build a good and staunch vessel. Great credit is therefore due to the staff of the Emergency Fleet Corporation of the district. In wood shipbuilding the great item of material is lumber. It takes approximately an average of one and a half million feet of timber to build one vessel of the 3500 ton type. Considering that approximately 151 vessels have already been built, or are now on the ways, or have been contracted for, would make a total of two hundred and twenty-six and one-half million feet of lumber, or an aggregate expenditure for

lumber alone of over nine million dollars. It is considered, at a rough estimate, there are approximately ten million dollars worth of outfitting material on docks alone awaiting to go into wood ship vessels building in District No. 11.

To supervise the construction of wooden ships requires some one at the head of the local organization who is thoroughly familiar with timber, and who possesses infinite executive ability, capable of handling an organization of a magnitude that can take care of a program as vast as has been outlined for District No. 11.

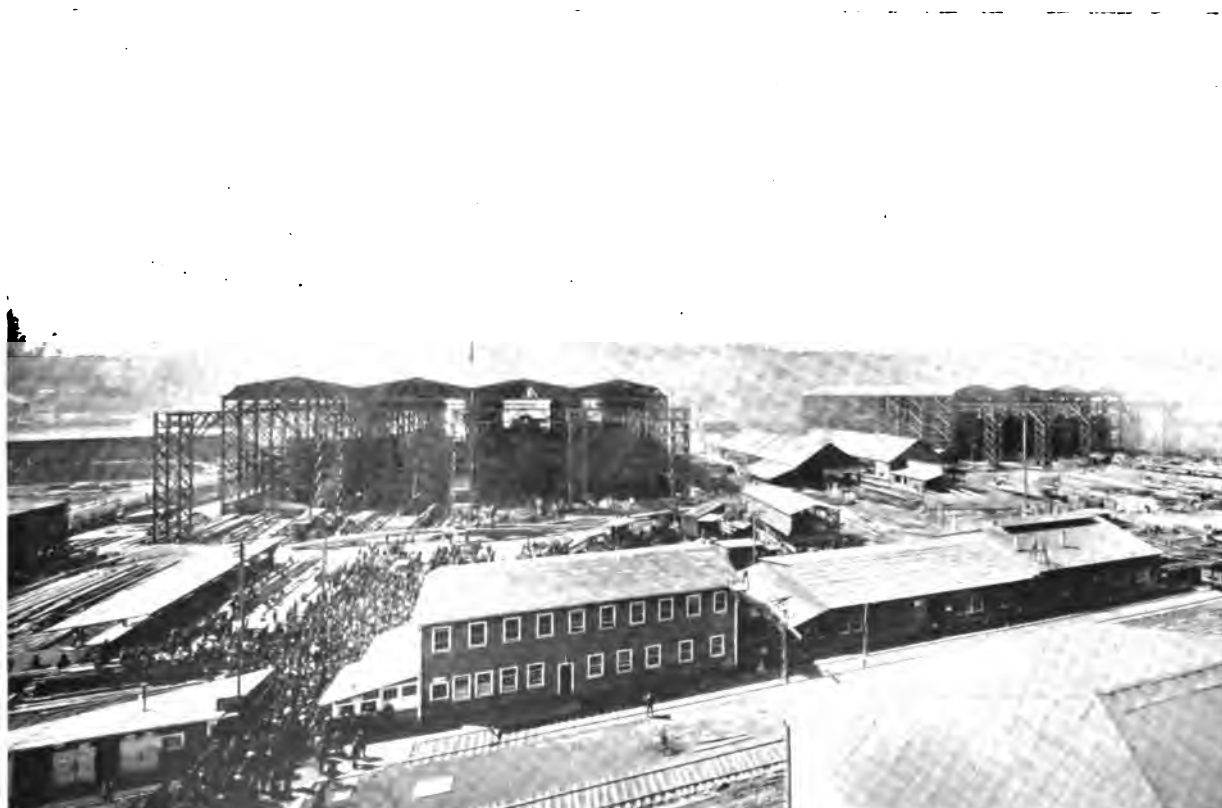
Such a man has been found in Mr. Lloyd J. Wentworth, who on January 1st, 1918, was appointed to the position of District Supervisor of the Emergency Fleet Corporation. In assuming this position Mr. Wentworth was actuated by the highest motives of patriotism, leaving the presidency and managership of a large lumber industry



J. W. Hall, Assistant District Supervisor, District No. Eleven, United States Shipping Board Emergency Fleet Corporation



Photograph of one of the shipyards in District Eleven, taken July 9, 1917, shortly after preparatory work had commenced on the site



The same yard from a photograph, taken nine months later, showing the remarkable progress made. Note the eight vessels under way

FIREMAN'S FUND

Insures Hulls, Cargoes,

HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

G. KIRKHAM SMITH, Special Agent
407 LEWIS BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

to accept a position as a dollar-a-year man for the Government. To supervise this vast work, it requires that a man devote his entire time to this duty; no private or personal work can be done, and to accept a charge of this character shows a desire to help his Government to the best of his ability in the time of its crisis.

Mr. Wentworth's past life and experience has peculiarly fitted him for this high position. Born and reared in the State of Michigan, "whence cometh all lumbermen", it is a natural sequence that such environment and his native ability should combine to produce another disciple of the lumber industry. Heredity was also a strong factor in determining his line of occupation. His father before him worked in the woods, and knew the music of "the murmuring pines and hemlocks".

In June, 1895, Mr. Wentworth was graduated from the University of Michigan, and the following October found him working in a logging camp in Minnesota. After a period he was transferred to Cloquet, Minnesota, where he was employed by the Johnson-Wentworth Company, working first in the yard and around the mill, and then in the office. In the meantime, Wentworth, Senior, became interested with other men in the Portland Lumber Company, Portland, Ore.

In 1901, Mr. Wentworth came to Portland and was assigned a position as clerk in the office of the Portland Lumber Company. This particular position was temporary and was designed to fit him for the managership later on. The company was then managed by Mr. O. A. Ritan. Mr. Jay Hamilton, at present secretary of the Fir Production Board of the Fleet Corporation, was also associated with the concern, and worked in the office alongside Mr. Wentworth. After a few months, Mr. Wentworth was made manager. He knew the business, and the business knew him—and liked him. He has been vice-president and general manager of the Portland Lumber Company from 1901 to date, or for seventeen years.

Mr. Wentworth is capably assisted in his work by Mr. J. Weston Hall, assistant district supervisor. Mr. Hall is fortunate in having a specialized capability. He is what might be called the "technical man" of the organization. Technicalities require the attention of a specialist and Mr. Hall amply fills this important post.

Mr. Hall is a natural shipbuilder, born not made, as he is descended from a family of shipbuilders on the New England Coast and has inherited his

natural aptitude for building ships. His knowledge of the shipbuilding business was gained through practical experience, having worked in shipyards from early boyhood, as well as much of the time while acquiring his engineering education. Mr. Hall has to his credit also the building of many miles of electrical railways as well as steam railways. Prior to his coming to the Emergency Fleet Corporation, he was assistant engineer on the Southern Pacific Company in charge of electrical installation, and subsequent to this was connected in an official capacity with the Union Pacific System. At this writing Mr. Hall is paying a visit to the home office at Philadelphia, laying before those officials a new plan for a 5000 ton ship to be known as the "Columbia" type ship, and which was designed in this district under Mr. Hall's supervision.

Assisting Mr. Hall and reporting direct to him are two gentlemen who also deserve a great deal of credit for the wonderful work that is being accomplished in the district—namely, Mr. J. L. Hubbard, chief hull inspector, and Mr. J. B. Morris, chief machinery inspector.

Mr. Hubbard started in his career as a shipbuilder by serving an apprenticeship as shipsmith in a shipsmith shop in San Francisco. He later served seven years as shipsmith and wood shipbuilder with Hall Brothers Shipyard at Pt. Blakely, Wash. After this he superintended the installation of the Winslow Marine Railroad & Shipyard plant and was for thirteen years associated with this company as superintendent and general manager.

Mr. Morris has also been fortunate in having a wide experience as a marine engineer and the results of his work indicate that he is bringing to his duty everything that he has learned from his practical experience. Mr. Morris served his apprenticeship at the Vulcan Iron Works, San Francisco, from which position he was in turn promoted to foreman and later to marine superintendent of the same company. He was later appointed inspector of construction for the same company. Subsequent to this Mr. Morris served for twelve years as chief engineer on vessels up to 27,400 tons, handling such vessels as the S. S. Korea, S. S. Siberia, S. S. Northern Pacific and S. S. Great Northern.

Great credit must also be given to the office organization of District No. 11. To correlate work and answer the demands made upon an organization of this character requires a great deal of executive ability. It has been said by representatives

INSURANCE COMPANY

Freights and Disbursements

STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Special Agent
220 BYRNE BUILDING
LOS ANGELES, CAL.

O. G. ORR & CO., Managers
ATLANTIC MARINE DEPARTMENT
37-43 WALL STREET NEW YORK

AND BRITISH COLUMBIA, 264 COLMAN BUILDING, SEATTLE, WASHINGTON

of the home office and by other outside concerns and people that District No. 11 seemed to be the best organized and the smoothest running of any district of the Emergency Fleet Corporation. This is all attributed to the spirit of loyalty and patriotism that inspires all members of the staff. The

one anxious desire of the district is to "speed the ships." To secure the desired results, it has been necessary to keep constantly before each and every member of the organization the motto of the district: "Let us think ships; let us talk ships; let us build ships."

Freight Report

By Page Bros.

THE Freight Report has become almost unnecessary lately, as the control of vessels, and the established rates for different parts of the world are all in the hands of the United States Government.

Two or three more steamers have been chartered to carry coal from Nanaimo, and in one or two cases also from Puget Sound to the West Coast. The last rate paid from Nanaimo was on the basis of \$14 per ton, and from Seattle one of the new 8800 tonners has offered to accept \$12 per ton to a nitrate port for a half or full cargo, and, from what we understand, has failed to get a charter.

No time charters have been drawn since our last report, two months ago.

Quite a business has been done in sailers and steam schooners for the West Coast, all at the same rate of freight, namely, \$45 per thousand feet.

For Australia, the latest charters reported have been three sailers chartered by J. J. Moore & Co., on the basis of \$48.50 per thousand feet to Melbourne.

Dant & Russell, Pacific Export Lumber Company, and Balfour, Guthrie & Co. have each chartered an auxiliary sailer for lumber from Portland to Shanghai at \$40 a thousand.

No transactions have taken place for Africa or the United Kingdom, as the Government will not allow our American lumber ships to go so far away from this country.

There is quite a demand for more tonnage for the West Coast and Australia at the rates mentioned above, which are the maximum rates allowed by the United States.

Twenty-five dollars per ton has been paid for nitrate for Honolulu, and it is possible that even a higher rate would be paid on account of the

increasing demand for this commodity for fertilizing purposes in the Hawaiian Islands.

Copra freights continue firm, and in good demand, on the basis of \$40 from Sydney, and \$45 per ton of 2240 pounds from the South Pacific Islands. The exporting of copra from Manila has been temporarily stopped by the Government.

The only sale of note, lately reported, has been that of Mayor Rolph's steamer, the "Joan of Arc," to New York agents for French account. The price mentioned is supposed to be on the basis of \$200 per ton on the dead weight, namely, about \$550,000.

Guy E. Tripp, formerly Colonel United States Army and head of production division, has been made Brigadier General United States Army, and placed in offices having charge of the production of Ordnance material in their respective sections of the country. The district chiefs will report direct to General Tripp, who is succeeded as head of the production division by Colonel C. C. Jamieson.

Mrs. William Cornfoot, wife of the president of the Albina Engine & Machine Works, was sponsor for the 3800-ton steel steamer Cadaretta, floated at 8 o'clock Labor Day morning. The vessel was the only one to go into the water in the state that day and was the seventh floated by her builders.

Stationary—ENGINES—Marine

50 H.P.-500 H.P.

FUEL OIL, DISTILLATE, GAS, KEROSENE

For Quick Delivery

A. H. COX & CO., Inc.

SEATTLE

WASH.

WAR RISK INSURANCE

NEW YORK underwriters do not take the same view of the war risk situation that many shippers have been so free to express during the past few weeks. The latter have grasped at the continued spell of freedom from undersea boat menace as a sure sign that Germany has tired of worrying American shipping at so great a cost as she has had to suffer without bagging any large game. War risk rates have been averaging a change about once a week for many months, due to the fact that submarines have operated sporadically. The latest reduction, underwriters believe, was scarcely justified, but they were willing to yield to the exporters and importers the benefit of whatever doubt existed as to the immediate renewal of enemy activities along the American coast. These rates the insurance concerns believe to be equitable.

"Unless the marine underwriters protect themselves by maintaining a reasonable schedule of war rates, there would be no marine companies in a little while." Those are the words of one of the men of long standing in the marine underwriting business. Continuing, he said: "There are several features that must be taken into consideration with the subject of war risk rates that the majority of persons fail to appreciate. The conditions that prevail today on our seas necessitate looking for losses in a direction other than from the destruction of a ship by a German submarine. One of these sinkings may wipe out all the premiums that we have received during a period of many months. Moreover, these conditions have brought about another source of danger with which we have to cope. In consequence of the stranding of vessels along the coast as the result of submarine operations, serious collisions are almost daily occurring between vessels and derelicts or wreckage. Herein is a claim for marine loss, which although not caused directly by a submarine and does not come within the realm of war risk, it is indirectly the result of the prevalence of war. This class of losses has become very formidable during the past few months, or since the enemy U-boats have been operating along our coast.

"Many of the vessels that have been so injured are among the best type of tonnage in the Government control, and as an evidence of the seriousness of this condition it may be necessary to ask the Government to do as the Allied governments have done, namely, establish a certain course which coasting traffic shall traverse, and then keep that lane free from derelicts and obstructions of every kind."

After being with the Todd Drydock & Construction corporation plant practically since its organization C. S. Holmes, secretary-treasurer has resigned and he left the company September 1st. The resignation of Mr. Holmes was tendered several months ago, but met with the request that he stay for a time pending further arrangements. Just what line Mr. Holmes will take up has not been announced. He has made many friends in Tacoma who regret exceedingly to see him sever his connection with the big company and possibly leave Tacoma. Prior to coming with the ship-building company he was with the Pacific Coast Steamship Company.

THIS MONTH'S COVER

Our cover this month depicts a bit of the California Coast familiar to thousands of travellers the world over, Cypress Point, Monterey Bay. Through the courtesy of Mr. A. C. Pillsbury, we have been enabled to reproduce this well-known scene, and any one wishing a copy of the original copyrighted photograph can secure same from the Pillsbury Picture Company, 219 Powell street, San Francisco.

The groups of purchasing agents appearing on pages 110 and 111 of this issue were made up from photographs furnished by the Bushnell studio, Seattle. The Bushnell studios enjoy an unique reputation in portraiture work, as is evidenced by the remarkably complete list of prominent Northwesterners who have had their portraits done by Bushnell.



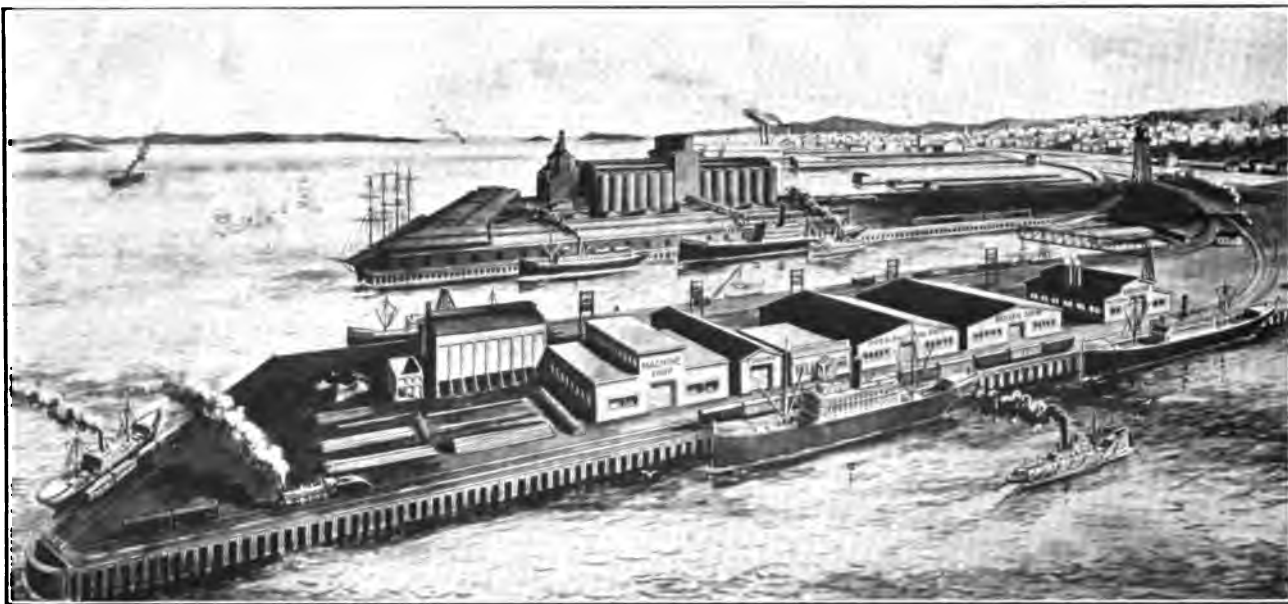
One of the locomotives secured by the United Commercial Company

RAILROAD EQUIPMENT FOR SALE

The United Commercial Company of San Francisco, with offices in the American National Bank Building, recently purchased the Colusa and Lake Railroad and now have the equipment from that line for sale. This equipment is stored at the firm's storeyards at South San Francisco and among other things the following 36-inch gauge equipment is available: thirty flat cars, eight box cars and two Baldwin locomotives. Other railway equipment now on hand for disposal includes fifteen standard gauge box cars and twelve standard gauge flat cars.



A section of the equipment storage yard of the United Commercial Company at South San Francisco, California



Astoria Marine Iron Works

Master Engineers and Ship Outfitters

*Outfitting Docks, 3500 lineal feet
Capacity, 12 vessels or more*

A Complete Marine Iron Works

Astoria

Oregon

PLEASE MENTION THE PACIFIC MARINE REVIEW WHEN YOU WRITE

In the Mails



Premier Manufacturing & Engineering Company



The Premier Manufacturing & Engineering Company, a wide-awake Portland concern which is expanding its business rapidly, has a large plant in the city. The plant is equipped with modern machinery and is capable of producing a wide variety of products. The company is known for its high-quality work and its ability to meet the demands of its customers. The plant is located in a strategic area, and the company is well-positioned to serve the local market. The company's success is a testament to its commitment to excellence and its dedication to its customers.

The plant is equipped with modern machinery and is capable of producing a wide variety of products. The company is known for its high-quality work and its ability to meet the demands of its customers. The plant is located in a strategic area, and the company is well-positioned to serve the local market. The company's success is a testament to its commitment to excellence and its dedication to its customers.

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The Premier Manufacturing & Engineering Company, Inc. has moved their offices from 138 Liberty Street to the Park Row Building, 15 Park Row, New York.



The plant of the Premier Manufacturing & Engineering Company, a wide-awake Portland concern which is expanding its business rapidly

*How would you like to
save \$1000 per boat?*



VIEWS OF
THE AIR PLANER

Taken in the
Pacific Coast Pennant Winning Shipyard
(Name Deleted)

Winning pennants in each Award

SHIPBUILDERS PNEUMATIC TOOL CO.
CHAMBER OF COMMERCE BUILDING PORTLAND, OREGON

PLEASE MENTION THE PACIFIC MARINE REVIEW WHEN YOU WRITE

This Machine Helped us Break Records



This Portable Scarphing Machine was developed and has been in successful daily operation in our own yards for eighteen months. It has been adopted by a number of progressive shipyards in this country and England to speed up shipbuilding.

New Scarphing Machine

This new invention will cut a smooth, accurate scarph in 10 MINUTES.

Is portable, handled over a plate by jib crane and trolley, reducing operations to minimum.

Is light in weight, speedily operated by electric motor.

Will cut, at any angle, a scarph of any length up to 16" and any width up to 8".

Is readily adjustable for any thickness of plate.

Prompt deliveries on any number of these machines. Wire or write for prices.

SKINNER & EDDY
CORPORATION
BUILDERS OF STEEL STEAMSHIPS
SEATTLE WASHINGTON

CONSISTENT BUILDING RECORD

OF

THE SKINNER AND EDDY CORPORATION—PLANT No. 1

For Two Years

FROM

3 Building Berths for the First Year

5 Building Berths for the Second Year

Also launched S. S. West Cressy, first ship from Plant No. 2, on September 21st,
60 working days from keel to launching

Name	D.W.T.	Keel Laid	Launched	Delivered	Keel to Launch		Launch to Delivery		Total Keel to Deliv.	
					Wkg. Days	Cal. Days	Wkg. Days	Cal. Days	Wkg. Days	Cal. Days
NIELS NIELSEN	8800	May 2, '16	Sept. 21, '16	Nov. 9, '16	119	143	41	50	160	193
HANNA NIELSEN	8800	May 11, '16	Oct. 21, '16	Dec. 22, '16	137	164	51	53	188	227
LUISE NIELSEN	8900	Sept. 23, '16	Jan. 23, '17	Mar. 10, '17	100	133	39	47	139	180
S. V. HARKNESS	10000	Aug. 15, '16	Mar. 22, '17	May 8, '17	188	220	40	48	223	268
JOSIAH MACY	10000	Oct. 23, '16	Apr. 21, '17	June 9, '17	151	180	40	50	191	230
STOLT NIELSEN	8800	Jan. 30, '17	May 22, '17	June 26, '17	96	113	28	36	124	149
JEAN SKINNER	8800	Mar. 27, '17	June 30, '17	Aug. 20, '17	81	96	41	52	122	148
LT. DeMISSIESY	8800	Apr. 25, '17	Aug. 16, '17	Sept. 19, '17	94	114	27	36	121	150
INDIANA	8800	May 25, '17	Sept. 15, '17	Oct. 20, '17	93	114	29	36	122	150
WEST HAVEN	8800	Aug. 13, '17	Nov. 1, '17	Dec. 24, '17	67	81	43	54	110	135
SEATTLE	8800	Aug. 21, '17	Nov. 24, '17	Jan. 5, '18	80	96	33	43	113	139
TRONTOLITE	10000	July 3, '17	Dec. 15, '17	Feb. 2, '18	138	166	39	50	177	216
ABSAROKA	8800	Sept. 5, '17	Dec. 22, '17	Feb. 12, '18	91	109	41	53	132	168
WEST ARROW	8800	Sept. 20, '17	Jan. 19, '18	Feb. 26, '18	100	122	31	39	131	161
WESTLAKE	8800	Nov. 8, '17	Feb. 9, '18	Mar. 9, '18	76	94	23	29	99	123
CANOGA	8800	Dec. 1, '17	Feb. 26, '18	Mar. 23, '18	71	88	21	26	92	114
OSSINEKE	8800	Dec. 26, '17	Mar. 14, '18	Apr. 13, '18	65	79	25	31	90	110
WESTERN QUEEN	8800	Jan. 2, '18	Mar. 28, '18	Apr. 25, '18	72	88	23	29	95	117
WEST DURFEE	8800	Jan. 25, '18	Apr. 11, '18	May 16, '18	64	76	29	36	93	112
WEST LIANGA	8900	Feb. 14, '18	Apr. 20, '18	May 4, '18	55	65	11	15	66	80
WEST ALSEK	8800	Mar. 4, '18	May 11, '18	June 14, '18	58	68	19	25	77	93
WEST APAUM	8800	Mar. 19, '18	May 23, '18	June 19, '18	55	65	22	28	77	93
WEST COHAS	8800	Apr. 2, '18	June 4, '18	June 29, '18	52	62	21	26	73	88
WEST EKONK	8800	Apr. 16, '18	June 22, '18	July 13, '18	57	67	16	22	73	89
WEST GAMBO	8800	Apr. 25, '18	July 4, '18	July 20, '18	59	70	13	17	72	87
WEST GOTOMSKA	8300	May 16, '18	July 17, '18	Aug. 7, '18	51	62	17	21	68	83
WEST HOBOMAC	8800	May 29, '18	July 27, '18	Aug. 17, '18	49	59	17	21	66	80
WEST HOSOKIE	8800	June 11, '18	Aug. 15, '18	Aug. 29, '18	54	65	11	14	65	79
WEST HUMHAW	8800	June 27, '18	Aug. 28, '18	Sept. 14, '18	51	62	14	17	65	79
WEST LASHAWAY	8800	July 8, '18	Sept. 12, '18	Sept. 28, '18	55	66	13	17	68	83
WEST LOQUASSUCK	8900	July 20, '18	Sept. 21, '18		50	64				

SKINNER & EDDY
CORPORATION
BUILDERS OF STEEL STEAMSHIPS
SEATTLE WASHINGTON

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ENGINEERS SUPPLIES

*To Shipbuilders and Marine
Outfitters:*

To relieve the war time emergency we have installed shop equipment to produce brass and iron body globe, angle, lift check, swing check and all styles of valves—both standard and extra heavy, from two to six inches; also all styles of flange fittings—standard and extra heavy, from two to twelve inches.

Shipbuilders and outfitters who are experiencing delays in securing supplies will find us ready to serve them in every way possible.

The Gauld Company.



MARINE TRIMMED VALVES AND FITTINGS

PORTLAND

THE GAULD COMPANY

OREGON

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ROTHWEILER RIVET SETS

Render maximum service because they are made from a specially prepared Chrome VANADIUM Steel, the kind that resists crystallization longest—the best that can be bought. They are hardened in electrically controlled furnaces and ground to size. Before leaving our factory each one is tested for size and hardness.

Rothweiler Rivet Sets will withstand crystallization and breakage longer than any other, and if they are not allowed to become too hot when in use they will last indefinitely.

"Flush Head," deep and shallow "Button Head" and "Cone Head" Sets are carried in stock.

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and carry Pipe, Fittings, Valves, Supplies, Belting, Power Transmission, Cranes, etc.

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NEW MECHANICAL BOLTING-UP TOOL

We illustrate herewith a new tool applicable to all classes of bolting-up work. Although this tool was designed and intended primarily as a shipyard device, it is obviously adapted to all kinds of structural work, boiler shop work, etc.

The mechanical features which make this tool attractive are a quick and positive means of attachment to the nut, which makes the nut and the tool practically integral during the operation in hand; the ratchet principle of tightening the nut, providing fourteen handle positions, this constituting a distinct advantage when handling the tool in limited spaces; elimination of nut distortion, due to gripping pressure being applied equally to four sides of nut, instead of two, as in the case of open end wrenches; and finally, the elimination of accidents due to workmen falling off staging when the ordinary wrench slips off the faces of a nut when the worker is exerting force on the handle.

It has been clearly demonstrated that less manual exertion is required in operating the tool than in the case of open end wrenches due to the gripping force being exerted on all four faces of the nut. The complete tool weighs twelve pounds and this weight is, of course, sustained by the nut during operations.

This bolting-up tool has been thoroughly tried out at several shipyards under actual working conditions and showed from 300 to 360 per cent greater efficiency, in the matter of speed alone, than was obtained on the same work with open end wrenches.



The method of attaching the Hunter bolting-up tool to the nut

The tool, which has been carefully designed to withstand the rough usage which such tools would naturally receive in a shipyard, was designed and patented by Mr. H. H. Hunter of San Francisco, with whom is associated



A comparison of the Hunter tool and the old open-jaw wrench. Arrangements have been made to produce this valuable shipyard adjunct in quantities to meet the rapidly growing demand

Mr. H. E. Douglas of Long Beach, California. Eccles and Smith of San Francisco are handling the distribution of this useful tool on the Pacific Coast.

THE CONCRETE MOTORBOAT "CONCRETE"

The United States Naval Reserve motorboat "Concrete" is now on its return trip to Chicago. Since the summer of 1917 the boat has been in the service of the United States Naval Reserve, Chicago, as a training boat for naval recruits. During the close of navigation last winter it made an overland trip to New York for the purpose of being exhibited at the motorboat show there.

This motorboat, built by Walter N. Dowsey at Iron River, Michigan, in 1914, leaped into public prominence in 1917, when Mr. Dowsey took the boat to Chicago and presented it to the United States Naval Reserve. It then became the first concrete vessel in the official service of the United States. It also had the distinction of being the first concrete self-propelling vessel in this country. Concrete vessels of other types—boats, barges and ships—were not new, but novelty and distinction were conferred on Mr. Dowsey's boat by the manner of its acquisition by the Government and by the service in which it entered. The boat had, until that time, been in the humble service of the lumber trade in Northern Michigan and would have con-



The Hunter wrench is built to withstand a large strain and rough usage

NEW BOLINDERS FOR SALE

TWO BOLINDER MARINE HEAVY-OIL ENGINES (1 starboard and 1 port), 320 B. H. P.; 4-cylinder each; Model M-11, with spare parts.

ONE BOLINDER ENGINE, 15 B. H. P.; Model B-11, Type R-12, with extras and spare parts.

ONE BOLINDER ENGINE, 8 B. H. P.; Model B-111, Type R-5, with extras and spare parts.

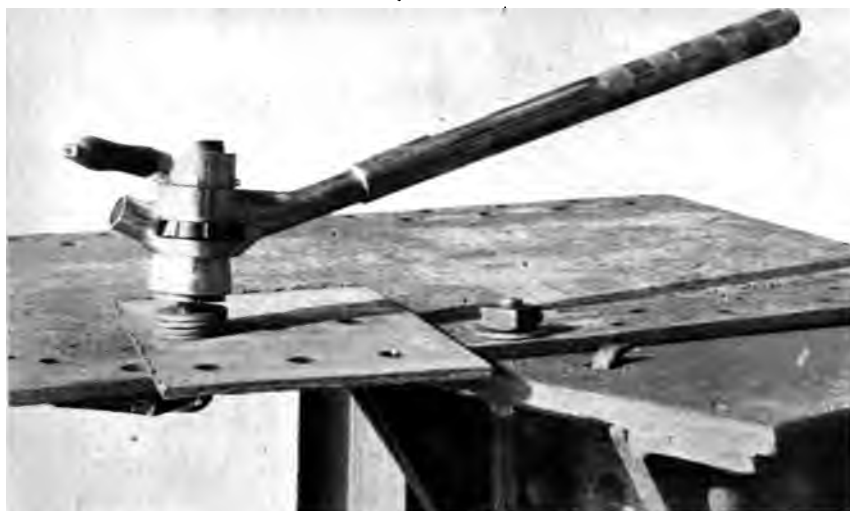
Above engines are now in bonded warehouse at San Francisco, subject to immediate delivery.

One new 54-inch submerged head Marine Donkey Boiler.

1 Drumm Street

C. & O. Lumber Company
Telephone Sutter 4771

San Francisco



A close-up view of the Hunter bolting-up tool, showing attachment handle and ratchet feature

tinued in that humble life except for Mr. Dowsey's generous and patriotic donation to his country.

Curtis Quincy Smith, in charge of the motorboat "Concrete", is a sailor of many years' experience, known to yachtsmen of the Great Lakes as the skipper of the *Amorita*, the biggest yacht on the Lakes, and has navigated almost every nook from Buffalo to Chicago and Duluth. He participated in the annual yacht race from Chicago to Mackinac several years and has won a string of trophies. In charge of the yacht of Harry Stutz of Indianapolis he navigated Green Bay and locked through the Wisconsin rivers. Yachting being too tame an occupation in time of war, Smith enlisted at the United States Naval Auxiliary Training School, Chicago, where he has been undergoing a course in navigation according to navy practice. He was chosen to head the recruiting mission of the "Concrete" by Lieutenant Commander Culp, recruiting inspector for the United States Navy, because of his unusual experience in navigation, as the people of the Middle West understand it.

Thomas F. Hogan, who acts as engineer of the "Concrete," is a member of the United States Naval Reserve Force at Chicago and has had considerable experience in navigation on the Mississippi River and its tributaries.

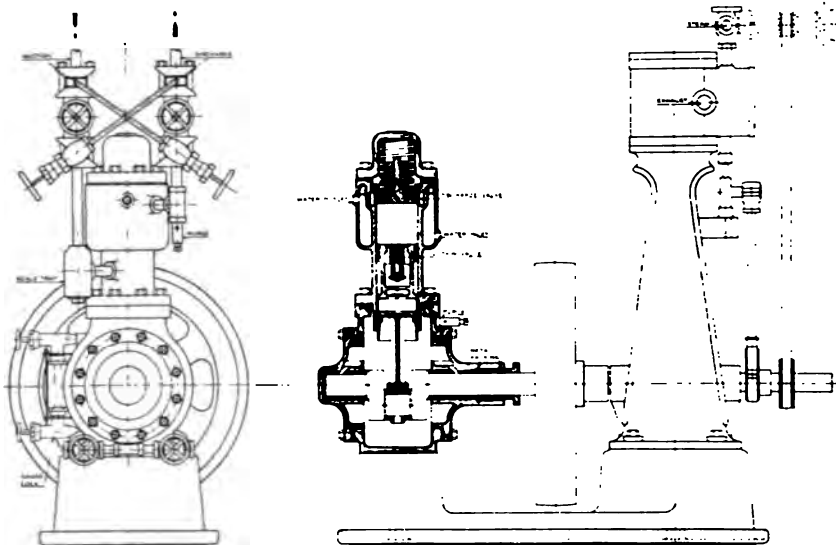
BUILDING REFRIGERATING SETS

One of the busiest plants in the Los Angeles district at this time is that of the Bedell Engineering Company, which is constructing refrigerating machinery for ten of the large steamers building at the Los Angeles shipyards, as well as caring for a large amount of other refrigerating business both for the merchant marine and for shore purposes.

The Bedell compressor is of the single acting, vertical, enclosed type, and is constructed for capacities of one-half ton upwards. The discharge valve is located in the cylinder head and is the same diameter as the bore of the cylinder. The suction valve of forged steel is located in the upper end of piston and its large area in-

sured a minimum lift. The suction gas enters the compressor cylinder at practically the pressure in the suction pipe. The piston is of the double trunk type and is unusually long in proportion to its diameter, thus providing a very effective guide. The cylinder is provided with an enclosed water jacket, allowing the discharged cooling waters to be carried away under pressure to any point desired. The cylinder is cast separate from the crank case and in double cylinder machines the cylinders are separate castings. The lubrication of the working parts is on the splash system, one filling of the crank case usually allowing for one year's operation. The condensers used with the Bedell apparatus naturally vary with conditions to be met. Condensers are either of the submerged type, the open or surface type, or the double pipe counter current type. The inner tube counter current condenser is of the well known Boyle Union type, without soldered or lathered joints.

The Bedell refrigerating plants have met with marked success on the Pacific Coast and elsewhere, and a large number of steamers have been fitted with these machines during the past few years.



Sectional View of Single Cylinder Compressor—Steam Driven

NEW PLATE BENDING MACHINE

A new cold plate bending machine, which executes compound curves, performing the work easily and rapidly, has been perfected by Chief Engineer S. J. Robinson, of the Pensacola Shipbuilding Company, Pensacola, Fla., and now is in successful operation in that yard.

It is pneumatic hydraulic in its operation, and was designed and built to do the work ordinarily done by the pyramid type of plate bending rolls.

The frame is made of 15-inch I-beams, carried on a concrete foundation. Between the beams are 14 pneumatic hoists, with 12-inch diameter pistons and 7-foot stroke.

On the top flanges of the I-beams are bolted structural steel formers with curvatures corresponding to the bends desired in the plate. The plate is placed vertically against the formers, and the bottom edge clamped in place against a structural steel bracket.

The rear end of the cylinders are piped for water instead of compressed air, and the length of stroke and speed of travel are governed by allowing the water to flow out through a controlling valve.

An especially valuable feature of the apparatus is its ability to bend warped surfaces at one operation, as the radius of the formers at any point determines the curvature at that point. The results on test came fully to expectations, and the machine is now in regular and continuous operation.—Emergency Fleet News.

HIGH SPEED is the title of the monthly stock list issued by the Illinois Tool Works and this list can be obtained from Louis G. Henes, 1637 Monadnock building, San Francisco, or 520 Title Insurance building, Los Angeles. The booklet lists a wide assortment of high speed reamers and milling cutters which are ready for immediate shipment on order. This stock list will be found of great value to purchasing agents, machine shop foremen and store keepers.

CHAMPION CRANES



The untiring response of Champion Cranes to the present day more-than-actual crane requirements justifies the consistent increase in public confidence in Champion Cranes.

This confidence is tangibly expressed by the ever increasing number of repeat orders received for Champion Cranes.

THE CHAMPION ENGINEERING CO. ENGINEERS MANUFACTURERS KENTON, OHIO

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Plant of the Northwest Spar Company on Lake Washington canal

A MODERN SPAR PLANT

Mr. Charles Cowen, president of the Pacific Northwest Spar Company, has recently moved his offices from the L. C. Smith Building to the plant of the company on Lake Washington Canal, in order to give his personal attention to the business.

Mr. Cowen was formerly a prominent real estate dealer, but, feeling the patriotic call, he decided he would be of more service to his country by taking up the manufacture of spars and masts, as he had formerly had years of training in the lumber business. The Pacific Northwest Spar Company has an ideal location for its plant, as it will be seen from the accompanying photograph—material can be brought to the yard either by rail

or through the canal, and the finished products shipped out in the same manner.

The spar plant built up by Mr. Cowen is thoroughly up-to-date and is fitted with lathes capable of turning sticks up to 140 feet in length. The plant has been busy for some time past filling orders from Skinner & Eddy, J. F. Duthie & Co., the Ames Shipbuilding & Drydock Co., and, in fact, practically all the shipbuilding establishments around Puget Sound, as well as from California yards, while Eastern orders have been booked from Pennsylvania, Maine, Ohio, Michigan, Florida and from across the border in British Columbia.



Mr. Chas. Cowen

A type of wire rope in which the steel wire strands have been specially covered with tarred hemp marline is now being marketed by the Geo. C. Moon Co., of Garwood, N. J.

The marline covering prevents friction between the strands when the rope is in use, affords protection against moisture, keeps abrasive dust away from the wire, and affords protection to the workmen's hands.

This "Crescent Hemp-Clad" wire rope, as it is called, has excellent advantages in marine service. It is flexible and can be coiled and handled as easily as manila rope, has from three to five times the strength for swell when wet, is not affected by ice in winter, and can be fastened around equal size, depending upon the grade of wire used—will not rust, does not slip cleats or bits with the ease of manila rope.

HOT DIP GALVANIZING
Large material our specialty.
Galvanizing Kettle 25 ft. Gin.

SEATTLE PIPE & GALVANIZING COMPANY
SEATTLE, WASHINGTON

ICE MACHINES
FOR SHIPS
"ON-TIME" DELIVERY

Approved by Shipping Board
BEDELL ENGINEERING CO.
LOS ANGELES

We offer our experience of many years as specialists in Marine Refrigeration.

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BATTLESHIP LINOLEUM

*The Flooring on the
BRIDGE to FRANCE*



Armstrong's Linoleum GOES OVER THE TOP

AT a time like the present, when our great nation, along with its allies, is devoting its best energies to the winning of the war, so many of our foremost industries are also giving their full measure of practical service toward a successful conclusion. The Armstrong Cork Company, whose products we sell, are manufacturing thousands of yards for government requirements. Our expert linoleum layers are installing this high-grade floor covering on the great cargo ships which are bridging the seas to France and elsewhere. This high-grade linoleum is chosen for its quiet, sanitary characteristics, and where durability is an important factor.

ONE ROLL OR A CARLOAD

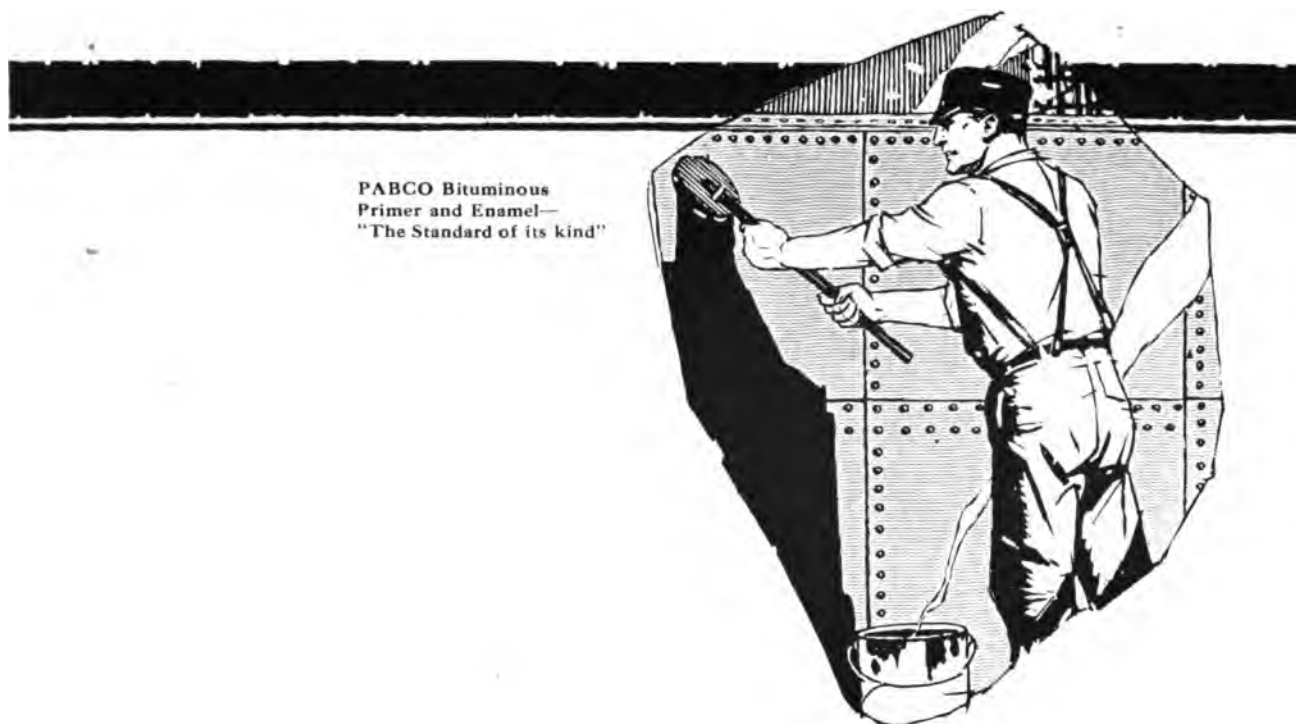
Permit us to figure on your requirements, whether it be for one roll or one carload. Our expert workmen are at your service to complete a perfect floor.

CORK FLOOR PRODUCTS CO.

202 BROADWAY

PORTLAND, OREGON

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We Contract to Apply As Well as Manufacture **BITUMINOUS ENAMEL**

We relieve shipbuilding plants of the work and responsibility of applying Bituminous Enamel—a **most important part** of steel ship construction.

Our trained organization and special equipment enable us to assume contracts of any size; and our **responsibility and experience** are ample assurance that the work will be completed **on time** and exactly as specified.



PABCO Bituminous Primer and Enamel comply with the U. S. Shipping Board Emergency Fleet Corporation specification No. 145, and is being extensively used in Pacific Coast yards with their full approval.

Let us figure on the application
of your Bituminous Enamel work.

Write or wire our Marine Department

THE PARAFFINE COMPANIES, INC.

Paint, Roofing and Flexible Flooring Division

34-40 FIRST STREET., SAN FRANCISCO

Manufacturers of

PABCO MARINE PRODUCTS

Paints, Bituminous Primer and Enamels and Seam-Tite(a packing for seams)

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IRON AND STEEL PRODUCTS**JAMES C. REDMAN**

RIALTO BUILDING
SAN FRANCISCO, CAL.

All Codes

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"Yellowstrand" Wire Rope
STEWART LOGGING BLOCKS

TOOL STEEL MILD STEEL SHIP FORGINGS

SHOP AND YARD
ENTIRE BLOCK
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*Marine Tanks for Oil and Water
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BRASS**BRONZE****COPPER**

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Machinists' and Engineers' Supplies

C. W. MARWEDEL

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SPANISH CEDAR
OAK TIMBERS

MAHOGANY
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ROSEWOOD

LIGNUM VITAE
AND OTHER HARDWOODS

TEAK

I Handle Only the Highest Quality of Stock Direct From Producers
Would be pleased to quote or receive a trial order

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Wholesale Hardwood Lumber Dealer and Importer

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A few high-grade Powell valves supplied by M. L. Kline

SUPPLYING THE SHIPBUILDER

With all the praise that has been due to the shipbuilders, very little has been said of the suppliers who are behind the shipbuilders of the Pacific Coast in outfitting and equipping the great ships which are to re-establish our merchant marine in the commerce of the world. The suppliers, in spite of the long distance from factories, mills and their source of supply, have played an important part in hastening the completion of ships, and the shipbuilders themselves fully appreciate the untiring efforts of these men, who have left nothing undone to get the equipment and outfitting material on the job when it is wanted, as well as anticipate their requirements for staple goods. And that this has been done in the face of the unprecedented shortage of materials and stock depletions, speaks volumes for the resourcefulness and energy of the Western suppliers.

The firm of M. L. Kline quickly recognized the importance of organizing their forces so as to supply the shipbuilders with the tremendous quantities of pipe fittings, iron pipe, valves and the thousand and one items required in the outfitting of ships.

Recognizing the firm as one of the leading headquarters for steam fitting supplies and plumbing in Portland, many leading American manufacturers have made M. L. Kline their agents in Oregon. Among the long list of representative lines this enterprising firm is handling are the nationally known Powell valve line, Thomas Devlin pipe fittings, Kelly-Jones valves, Standard Sanitary enamelware and Federal-Huber brass fixtures and special fittings for government vessels. M. L. Kline has furnished plumbing fixtures, steam fittings and heating material for a number of government vessels recently built on the Northwest Coast and has supplied this material in accordance with government specifications for Ferris, Hough type and the new 5000-ton wooden vessels as well as the 8800-ton steel ships.

A few of the lines handled by M.



Mr. M. L. Kline

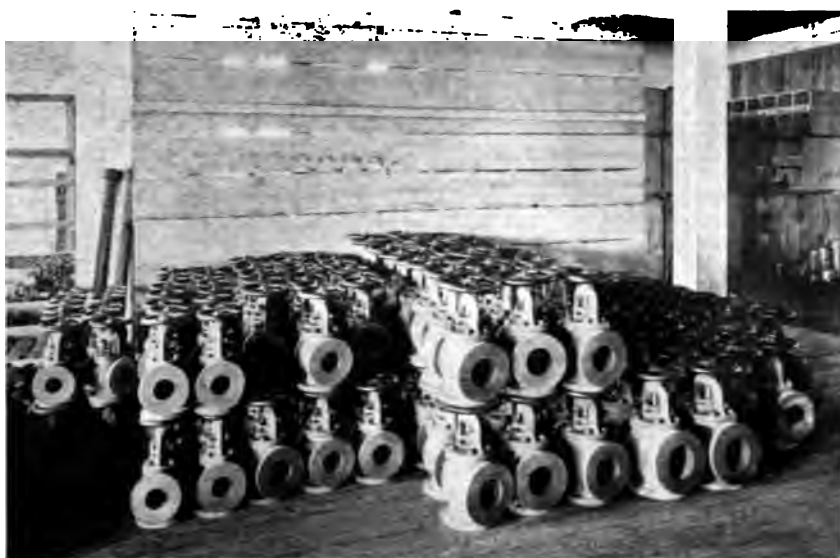
L. Kline include Jenkins valves, Williams valves, Youngstown Sheet and Tube Company's pipe, U. T. Hungerford and Company's brass and copper pipe and tubing, Walworth Manufacturing Company's pipe fittings, valves, Stillson wrenches, vises and Crandall packings and other recognized packings, also other standard lines well known to steamfitters and engineers. High-grade plumbing supplies include the lines of H. Mueller Manufacturing Company's fine brass goods, Wm. Heap and Sons' plumbing woodwork and also the earthen products of the Pacific Porcelain Ware Company.

M. L. Kline's slogan is "Faultless Quality and Prompt Service", and after being engaged in wholesaling plumbing and heating supplies in Portland for over thirty years, Mr. Kline attributes the successful business he has built up to strict adherence to this policy. Mr. Kline spells SERVICE with capital letters.

The American Screw Propeller Company of Philadelphia, designers of screw propellers and propulsive experts, take pleasure in stating that they have designed the propellers for over 450 vessels now building and on contract. This company's clientele now consists of nearly fifty of the largest American and Canadian shipyards, ten prominent steamship lines, eight naval architectural and engineering concerns, and a number of engine builders.

The business of the American Screw Propeller Company consists of designing marine propeller wheels for all classes and types of vessels. They have designed more propellers than has anyone else; furthermore, their talent and equipment for this work is unrivaled, which fact is proven by the prominence of their clientele. A booklet is issued by this company, which can be secured by anyone writing for the same under their business letterhead.

The Chicago Pneumatic Tool Company announces the appointment of Mr. C. W. Cross as special representative for the sale of Pneumatic Tools to railroads, vice Mr. L. C. Sorague, promoted to be District Manager of Sales for the company at New York.



A group of Kelly-Jones valves furnished by M. L. Kline



Hot Dip Galvanizing
BY THE
Largest Galvanizing Plant on the Pacific Coast

Special Attention Given to Ship Requirements. Prompt Deliveries.

PACIFIC METAL AND GALVANIZING CO.
Seattle Wash.

EAGLE BRASS FOUNDRY COMPANY
BRASS FOUNDERS, PATTERN MAKERS
MACHINISTS

It Will Be Right There and Right When It Gets There

W. ANDERSON, President

SEATTLE WASH.




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This company was founded in 1840—seventy-eight years ago. Our commercial experience has enabled us to perfect an organization for the assembly and sale of merchandise ranking with the highest in this country.

**Port Lights Bulkhead Lights Chocks Bitts Cleats Chain Bolts Nuts
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From Keel to Truck **GEO. B. CARPENTER & CO.** From Stern to Stern

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THE LARGEST STOCK OF HARDWOODS IN THE WEST

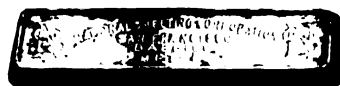
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**Relaying Rails
Usable Structural Steel
Complete Plants Bought
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*Spur Track Yards
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**Babbitt Metal
Type Metal Solder
Ingot Copper Ingot Brass Pig Tin
Pig Lead Zinc Aluminum
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NATIONAL SMELTING CORPORATION
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**One Million Pounds
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**14 CARLOADS OF STEEL TANKS
READY FOR SHIPMENT**

NATIONAL STEEL CONSTRUCTION CO.
SEATTLE, U. S. A.

PLEASE MENTION THE PACIFIC MARINE REVIEW WHEN YOU WRITE

GALVANIZING, AN IMPORTANT INDUSTRY

The vast expansion of shipbuilding all along the Pacific Coast has resulted in radical changes for many industries. Concerns which formerly counted marine business as but a side issue now find that conditions have been absolutely reversed and that it is the shore business which is the side issue, while marine demands are keeping them working to their fullest limit. No more marked effect in any industry is shown than in the galvanizing shops. Concerns specializing in this work have been forced to expand their facilities to meet the urgent demand, and one of these plants which has just undergone a great extension is that of the Seattle Pipe and Galvanizing Company. This company has just constructed a plant which is housed in a building 52 by 150 feet. The galvanizing kettle is 25 feet 6 inches long and is one of the largest on the Pacific Coast outside of that in the new galvanizing plant of the Potrero plant of the Bethlehem Shipbuilding Corporation at San Francisco. There is also a thirty-foot pickling tank. The building is high, having twenty-four feet of head room under the ceiling, thus permitting of the proper use of travelling cranes, of which there are three in operation as well as several bracket wall cranes. The officers of the Seattle Pipe and Galvanizing Company are: M. M. McElwaine, manager and secretary; F. E. Rautman, president; C. A. Davis, vice-president, and A. E. Ayres, treasurer.

METERS FOR WIRELESS AND HIGH-FREQUENCY WORK

A high-grade hot wire measuring instrument, designed particularly for wireless and other high-frequency work, depending for its operation upon the expansion of a metal strip which is heated by the current to be measured, has been developed by the Westinghouse Electric & Mfg. Co. The slight sag in this conducting strip is magnified several hundred times on the scale by means of a combination of wires and a deflecting spring.

The conducting strip is made of special non-corrosive material. The separating posts have the same temperature co-efficient of expansion as the conducting strip, so that the changes in room temperature do not cause an error in the reading of the instrument.

The instruments are furnished in two forms, for flush mounting and portable. Similar instruments for



Plant of the Seattle Pipe and Galvanizing Company

switchboard mounting are also supplied.

The flush-mounting form, known as type EH, is of the round, open-face type. The face is three inches in diameter, and the diameter outside the flange is 3 3/4 inches. It has a black rubberoid case and rim, with white dial.



The portable form known as type PH is mounted in a morocco-leather-covered wooden case with heavy glass over the dial. The case is 3 3/4 inches by 4 3/8 inches by 2 inches thick.

The scale plate is made of metal, and the scale subtends an arc of 90 degrees, being 2 3/8 inches long.

The type EH meters have a guaranteed accuracy of 2 per cent, while the type PH with hand-marked-scale can be expected to show an accuracy within one per cent of full scale. Standard meters are for 1, 2 and 5 amperes. Care must be used not to subject the instrument to more than 200 per cent load.

NEW STORE OPENS DOORS

Crowds were waiting at all six entrances of the new Frederick & Nelson Store, Fifth Avenue and Pine Street, Seattle, when it opened at 9 o'clock on Tuesday morning, September 3. The doors were opened by the six oldest employees of the store.

There are six floors in the new store, which is arranged with as much similarity as possible to the old one, from which the firm moved over Labor Day, the establishment closing on the Thursday evening preceding.

New and complete stocks were found by the visitors in the new store, with particularly elaborate and elegant displays in the windows. Already the store has made a decided difference in the appearance of the streets in the vicinity, Pine street being thronged and Fifth avenue carrying a liberal sprinkling of walkers.

The building is especially notable for the efficiency of its lighting and for having all departments except the garage under one roof. Among the features is an auditorium that seats 400 and is equipped for the showing of moving pictures. There are good restaurants for men and women, and a nursery.

On the stage in the auditorium on opening day was the service flag of the store, carrying 43 names. Many letters of congratulation were received from merchants all over the United States and Canada, and in the auditorium were shown floral pieces that had been sent by these and by competitors and other friends in Seattle. D. S. Frederick, head of the firm, stood on the main floor and welcomed many of the customers.

An addition to the service that the store furnished in its previous location is a greatly enlarged basement salesroom for lower priced goods.

CHANGE IN THOR ORGANIZATION

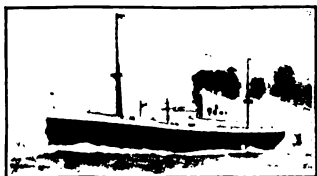
Mr. F. H. Charbono, who for many years has represented the Independent Pneumatic Tool Company in the East, traveling out of the New York office, has just been appointed manager of the Southern district, with headquarters at No. 1721 Jefferson County Bank Building, Birmingham, Ala. Mr. Charbono succeeds Mr. Geo. C. Wilson, who has resigned to look after his interests in the North.



New headquarters of Frederick and Nelson, Seattle

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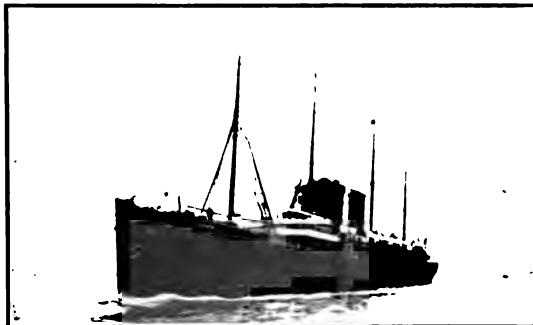
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Never in history has there been an opportunity to invest money in such a stable issue or such a glorious purpose or for the furtherance of such an inevitable result.

Buy this Liberty Loan with the same spirit that takes our boys "Over the Top" and the new issue will be so greatly over-subscribed that it will put to shame all of our previous efforts.

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PACIFIC COAST LAUNCHINGS

From August 21st to September 20th, Inclusive

August 21st—Vimy, 3000-ton auxiliary vessel. From Foundation Company, Tacoma, Washington.

August 21st—Colonel Driant, 3000 ton auxiliary vessel. From Foundation Company, Portland, Ore.

August 22nd—Tokai, 3500 tons dw., Ferris type. From Meacham & Babcock Shipbuilding Company, Seattle, Wash.

August 22nd—Ocuturara, 3500 tons dw., Ferris type. From Nilson & Kelez Shipbuilding Company, Seattle, Wash.

August 24th—Zaca, 9400 tons dw. From Moore Shipbuilding Company, Oakland, Cal.

August 24th—War Camchin, 2800 tons dw. From Foundation Company, Victoria, B. C.

August 24th—War Kitimat, 2800 tons dw. From New Westminster Construction Company, New Westminster, B. C.

August 24th—Anthera, 3500 tons dw., Ferris type. From Grant Smith-Porter Ship Company, Aberdeen, Wash.

August 26th—West View, 8800 tons dw. From Northwest Steel Company, Portland, Ore.

August 26th—Bosworth, 3800 tons dw. From Allen Shipbuilding Company, Seattle, Wash.

August 27th—Westmead, 8800 tons dw. From Ames Shipbuilding & Drydock Company, Seattle, Wash.

August 28th—West Hamhew, 8800 tons dw. From Skinner & Eddy Corporation, Seattle, Wash.

August 28th—Oskaloosa, 8800 tons dw. From Schaw-Batcher Company, So. San Francisco, Cal.

August 28th—Brookfield, 4000 tons dw., Ward type. From Grays Harbor Motorship Corporation, Aberdeen, Wash.

August 29th. Medford, 3500 tons dw., Ferris type. From Grant Smith-Porter Ship Company, Portland, Ore.

September 2nd—Cadaretta, 3800 tons steel freighter. From Albina Engine & Machine Works, Portland, Ore.

September 2nd—Wakiki, 3500 tons dw., Ferris type. From Wilson Shipbuilding Company, Astoria, Ore.

September 4th—Oleander, 3250 tons dw. From Anderson Shipbuilding Company, Houghton, Wash.

September 8th. General Serret, 3000 tons dw. From Foundation Company, Portland, Ore.

September 9th—Hesperian, barkentine. From the Rolph Shipbuilding Yards, Eureka, Cal.

September 11th—Republique, 3000 tons dw. From Foundation Company, Tacoma, Wash.

September 12th—West Lashaway, 8800 tons dw. From Skinner & Eddy Corporation, Seattle, Wash.

September 14th—Kokoma, 3500 tons dw., Ferris type. From Grant Smith-Porter Ship Company, Portland, Ore.

September 14th—Nancy, 3000 tons dw. From Foundation Company, Portland, Ore.

September 18th—Dungeness, 3500 tons dw., Ferris type. From Seaborn Shipyards Corporation, Tacoma, Wash.

September 18th—West Cape, 8800 tons dw. From Ames Shipbuilding & Drydock Company, Seattle, Wash.

September 20th—Nahnet, 3500 tons dw. From Sloan Shipyard Company, Olympia, Wash.

September 20th—Bowesmont, 3500 tons dw., Ferris type. From Wright Shipbuilding Company, Tacoma, Wn.

WHITE BROTHERS' BULLETIN

A canvas of the hardwood trade shows that increased buying before July 1st, in order to get the advantage of the old lower freight rate, was very general, and that inasmuch as there was a liberal supply of freight cars at that time, most of the lumber was delivered and is now in the hands of the consumers.

This has caused a considerable sluggishness in the hardwood market during the last two months. This showing up, however, has not had an appreciable effect on prices.

The enormous demands of the Government for hardwoods have affected the situation to such an extent that there are very few mills in the country which are not turning out lumber to their fullest capacity. Add to this condition the fact that the mill yards have only the slenderest of stocks on hand and it can be easily seen that a lowering of prices to any appreciable degree is hardly within the bounds of probability.

The advance in prices during the last month, due to the increased freight rates, has had no adverse effect on the amount of hardwood sold, as the same proportionate advances occurred in all other articles of commerce.

The conspicuous points of the general price situation are as follows:

Quartered Oak is very firm and selling well.

Plain Oak is also firm, but the demand for thicker stock is not so good as it was a month ago.

Ash and Hickory are experiencing a very steady demand.

Southern Red Gum is stationary.

The demand for Poplar is very great and the Government requirements have made it quite scarce.

Jeniseo is having a good sale, as architects and builders are taking up this wood again after several years of quiescence.

Mahogany seems to be a little more plentiful now that the Government has gone over most of the stocks in the country and taken out its requirements for airplane work.

The good news from the Western front has had a very heartening effect on the entire country and makes everyone strive with more effort to win the war decisively and promptly.



"The Columbian Crew" house organ of the Columbian Rope Company in its new dress

"THE COLUMBIAN CREW IN A NEW DRESS"

The house organ of the Columbian Rope Company at Auburn, N. Y., has just appeared under a new title, "The Columbian Crew", a new size in four colors. The Columbian Rope Company are anxious to send this to everyone who handles Columbian rope, and a request on your letterhead will result in its coming to you each month.

There is no other obligation than that you handle or help to sell Columbian rope.

BUSINESS ANNOUNCEMENTS

The Weiss Engine Company announces the election of the following officers: Lucien I. Yeomans, president; Carl W. Weiss, vice-president, and Charles B. Page, vice-president and general manager. This concern will manufacture the new "Weiss" engine which is arousing a great deal of interest among engineers and which is described elsewhere in this issue of the Pacific Marine Review. The offices of the new engine building company are located in the Edison Building, 72 West Adams street, Chicago.

Mr. Henry H. Edwards, Vice-President of the Bantam Ball Bearing Company, Bantam, Conn., being the only bachelor member of the Board of Directors, recently decided, that life in a state of single blessedness was too lonely, and on July 26th took unto himself a wife. After a short honeymoon in the Adirondacks he has returned to his desk and is receiving the congratulations of his friends.



The plant of the Columbian Rope Company at Auburn, New York

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Pacific Marine Review



November 1918

SPECIAL NOTICE TO USERS OF OXYGEN

THE requirements for Government work make it imperative that every Linde cylinder be emptied and returned immediately.

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42nd STREET BUILDING

NEW YORK

PACIFIC MARINE REVIEW

November, 1918

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Our New Merchant Marine---The Problems of Its Future Existence and Growth

NOW that the United States is rapidly building a merchant marine, which will be available for use after the war, the next step is to determine how it can be maintained in competition with the rest of the maritime world, for, if that competition is met its further growth is assured.

Much has been spoken and written about the building of this merchant marine. Trade routes have been laid out and wonderful pictures painted of trade possibilities. Earnest and wonderful work is being done in building our merchant marine. In all literature and speeches from the Construction Division of the United States Shipping Board, the writer can find no attempt made to solve the after-war normal competitive operating problems. Their work now is ship construction, and they are doing it well—feeling, perhaps, that once we have a merchant marine, the problem of its maintenance will be solved by those who come after. Their articles, perhaps, indicate the lack of pre-war experience in vessel operation; nevertheless, it is the duty of every American shipowner to get back of the Shipping Board and boost for an American merchant marine, for it is a necessity regardless of its future problems.

The shipowner should spread the gospel of an American merchant marine throughout the length and breadth of the land, but the burdens of operation should also be stated, for the sooner will that problem be solved.

Mr. Edward N. Hurley, chairman of the United States Shipping Board, has truthfully stated that we had practically no merchant marine before the war, but the reason therefor was not set forth. It is a simple statement: No American shipowner could compete in the foreign trade. He had no protection or assistance from his Government. It was fortunate that our coastwise trade was protected, for it was the only thing that President Wilson could draw on to send our soldiers and supplies over seas, until we could build more ships, and we had to resort to borrowing and requisitioning from other nations to make up the balance; but think of the humility, loyal Americans, of having to borrow ships from other nations when the existence of our own nation was threatened.

The necessity for an American merchant marine has been thoroughly brought home to the minds of the American people, and grim war was the final convincing instrument. The American shipowner

This is the first of a series of articles on Merchant Marine Operation which will appear in the Pacific Marine Review. The article for December will deal with this subject as handled by pre-war Foreign Maritime Powers.

appealed to Washington year after year, for better laws and assistance to place the American flag on the sterns of American ships in foreign ports, but each appeal was met with more drastic laws, and the final knockout blow was the LaFollette Seaman's Bill. The Pacific delegation of shipowners, headed by Captain Robert Dollar, the most experienced shipping man on the Pacific Coast, made a noble fight against this legislation, flooded our Senate and House of Representatives with undeniable evidence, yet Captain Dollar and his committee came home defeated. Votes counted more in Washington at that time than a merchant marine.

Those shipping firms struggling in the trans-Pacific trade either sold out or changed their vessels to foreign flags. Then came the war, and official Washington had to use a magnifying glass to find its ocean-going merchant marine. We had a few vessels in our protected coastwise fleet that could ply across the ocean. Freights soared immediately, so that any old hulk could make profits, and the old hulks that had been legislated on the mud flats immediately came forth. The argument was then advanced in Washington that the American shipowners in the trans-Pacific trade had been too hasty, that the LaFollette bill had not put them out of business, and pointed with pride to that resurrected cast-off fleet which was now making great profits. No, readers, war made an American merchant marine a necessity in spite of the LaFollette bill, and the profits being made by those old hulks we were able to dig up, are bloody war profits.

But now that we have an American merchant marine, how are we going to maintain it in after-war competition with other experienced maritime powers? The Pacific Shipping and Maritime Committee of the Associated Chambers of Commerce of the Pacific Coast, has advocated, and is working on the formation of an American Shipowners Association, to have four branches—an Atlantic, Great Lakes, Gulf, and Pacific. The first object of this association could be the "teaching and preaching" of an American merchant marine throughout our United States. Secondly, it could make harmonious shipping suggestions to the United States Shipping Board and Congress in regard to vessel operation and maintenance. Thirdly, it could keep in close touch with the actions of other maritime nations, with a view to meeting such competition, so far as laws and

regulations are concerned. Fourthly, it could act jointly in regard to wages and working conditions for seamen. Does not this plan seem the feasible one to adopt for publicity on our merchant marine? The coast States of our Union, through such an association, are surely able to finance such publicity.

Taking for granted that we have an American merchant marine, and that the American public is with the Nation as to the necessity for an American merchant marine, how is that merchant marine to be maintained in peace times? That question brings up two important problems—the cost of building and the cost of operation. These questions have not been touched upon by literature from the United States Shipping Board, so far as the writer has been able to gather, but it may be interesting to quote a few articles which perhaps almost touch on operation:

1. From the G. M. Standifer Shipbuilding Company, Portland, Ore., Magazine "Over the Top": "We are remodeling our ports and preparing to run our ocean fleets as we run our railroads, with the lowest freight and passenger rates in the world and the best service and a reasonable profit for the people who put their money into them."

2. From the Pacific Marine Review, October, 1918, article on "Backing American Ships with American Dollars": "The world owes us a great deal of money, but our principal debtors are the great manufacturing and exporting nations, like England, France and Italy. Naturally they will pay their debts in goods as far as possible, and much of the trade which grows out of these obligations will take the form of shipments of American raw materials to make the goods with which they will pay us. Necessity will also lead them to be active sellers of manufactured goods in South America, the British Colonies and the Orient, and in that trade there will never be either American competition or jealousy over business that properly belongs to them, because we realize the enormous sacrifices they have made for humanity, and we wish to see them return to peaceful prosperity as fast as possible."

Comment by the writer: What trade does this leave the American ship on the Pacific with India, New Zealand and Australia, British Colonies, and China and Russia at the door of Japanese shipping? Until we can compete, Japan will carry our products to those Pacific nations requiring them, because they can offer as good and as quick a service as we can, and at a cheaper rate. Even the Philippines will be supplied and relieved by foreign ships unless our coastwise laws are extended to these possessions.

3. From the Government Printing Office, August, 1918, an article entitled "What Will General Delivery Service Mean to You?": "When the war ends, there will be work for ships all over the world. Peace will soon make the British mercantile marine as strong as ever. The Norwegians and Japanese are building ships. The Germans will undoubtedly rebuild their mercantile marine. So it is possible to look ahead and see times coming when we must compete with these nations, and we shall never hold our own unless both our ships and our foreign trade are organized along efficient delivery lines that facilitate business at home."

Comment by the writer: This statement admits the possibility of after-war competition.

A circular letter to chambers of commerce, etc., urging the spreading of American merchant marine publicity, states: "It isn't what we are going to get out of it that counts so much, as what we are going to put into it."

Now the experienced shipping man expects to get something out of what he puts in, and it is therefore the duty of the experienced pre-war ship operator to state in print what he knows, so that the Shipping Board and the Emergency Fleet Corporation may take note, and if possible prepare in advance; for, as Ralph D. Paine writes in the "Ships and Sailors of Old Salem": "Whenever the United States shall really desire to regain her proud place among the maritime nations, the minds of her captains of industry will find a way to achieve it and her legislators will solve their share of the problem." Now, we all know how our legislators of the past have solved the problem of our merchant marine, but times have changed, so let's forget the past and trust to our legislators of the future, and it is up to the maritime States of the Union to see that proper legislators are elected.

What were some of the handicaps under which our merchant marine labored during pre-war times? The building and operating costs of British and American vessels, given below, have been taken from the "Memoirs of Captain Robert Dollar," that master mind of American and foreign shipping who never writes or states anything he cannot confirm:

First. Building Cost or Initial Investment.—In 1912 the cost of building a 9000 deadweight ton steam vessel in Great Britain was £70,000. Five American steamers of the same size were then being built on the Delaware for £142,000 each, a difference of £72,000 per vessel, or roughly \$350,000. How can this handicap be overcome? It is true that the cost of building has gone up in England, but much more has it gone up in America. That handicap is still with us, and it looks as if it will remain with us.

Second. Cost of Operation.—The cost of operating the American-built 9000-ton deadweight vessel was £3,650 per annum greater than its English competitor, without taking into consideration the higher first cost of \$350,000 of the American vessel. Let us see the difference when this is taken into consideration. Allowing 16 per cent on this extra first cost of £72,000 for interest, depreciation and insurance, means an additional handicap to the American steamer of £11,520 per annum. Operating costs have gone up in Great Britain, but much more have they gone up in the United States."

In 1862 we had the largest foreign fleet and the best ships of any nation, with 2,496,900 tons in the foreign trade alone, while in 1912 we had less than 500,000 tons engaged in our foreign commerce. Foreign governments helped their shipping with favorable laws and subsidies. Our own Government then proceeded to further aid our competitors by framing detrimental American shipping laws, while all the time our standard of living has gone up in a greater proportion than that of other nations.

There is really but one way by which American capital can compete in the foreign ocean trade, but that is one which no true American can advocate. That plan is, to buy ships wherever you can buy them cheapest, place them under the flag where they can be operated cheapest, and operate them

with the cheapest crews obtainable. That, however, would not mean an American merchant marine in time of trouble, nor an American personnel, though foreign money would flow into the United States to the credit of American capitalists. Throwing out that plan as too un-American, there seems to be but two plans left:

First: Government operation, with the losses placed on the American public by an annual marine tax, and why not a marine tax? The people are accustomed to taxes on many unessentials, and one more little tax on an essential should not make any difference.

Second: Private operation under Government supervision, allowing such private operators to earn at least eight per cent net, which would stimulate further ship investments; the loss, if any, to the private shipowner to be made good by the Government; the Government in turn to reimburse itself by a national annual marine tax.

The amount of this marine tax would depend largely upon our legislators. Wise laws would greatly reduce it. Had we colonies and fueling stations all over the world the same as Great Britain, we might in time be able to overcome all our handicaps.

The above might be considered the fundamental handicaps under which American shipping has labored in the past, so let us now place in print a few of the minor handicaps, which, if removed, will tend somewhat to reduce our operating cost handicap. The following suggestions are the result of questionnaires sent to one hundred and fifty American steamship owners by the Pacific Shipping and Maritime Committee of the Associated Chambers of Commerce of the Pacific Coast:

1. Steamboat Inspection Service.—This should be entirely changed so that the individual ideas of the inspectors are the same in every port. Great Britain's inspection and classification system has proven the best in existence and should be adopted. Why not place the inspection service in the hands of our American Bureau of Shipping, American Lloyds, transferring all the necessary men from the United States inspection service to that bureau? Lloyds surveyor is like the American Standard Oil five-gallon can—you stumble over him in every port—and he is your experienced help in time of trouble. That plan, readers, will result in system, service and economy.

2. Measurement of Vessels.—The measuring of our ships should conform to the general practice of other nations, and we should copy the British rule. The American system of measurement places a handicap on the American-owned ship.

3. Panama Canal Tolls.—The American foreign-going vessel carrying deck loads should not be obliged to pay canal tolls on that deck load. The Suez Canal does not exact such payment.

4. The number of officers and crew required on American vessels of different tonnage should be made to conform to the requirements of Great Britain.

5. The increased requirements of the United States for qualifications of both officers and crews in the form of certificates and licenses over those imposed by foreign nations restrict the number of real American men available. Our requirements should conform to those of Great Britain.

6. The present more costly scale of victualing

American vessels should be changed to conform to those of Great Britain.

7. The seaman's law should be revoked, or at least suspended, until a concurrent law has been enacted by the principal maritime competitors of the United States. We should base our maritime laws upon those of the most successful and experienced maritime nations. The writer does not wish to convey the impression that the entire seaman's law is bad, but the American shipowner has left voluminous testimony in Washington in an endeavor to eliminate the bad features. It has been found impossible to live up to this law in all its features in our present emergency. The provision requiring the payment of one-half wages due to seamen on arrival at each port, and pay every five days while in port, has resulted in continuous drunkenness on shipboard while in port and therefore a useless crew. This system of payment has put a premium on desertion in foreign ports, and plays directly into the hands of unscrupulous boarding-house keepers, who control the supply of and furnish the crews. It makes it easy for seamen to abandon vessels when they may be most needed, thereby handicapping the handling of freight, passengers and United States mail at ports where it is impossible to procure other men with the certificates of competency demanded by the United States Government. England does not place a seaman's contract in a special category; it is as binding in law as any other contract. Special privileges in law for seamen are no longer necessary. They now place their own laws on the statute books, and know what they want. The language test and the able seaman's certificate have also been disregarded. The Government found it could not man its new merchant marine and live up to the law; the law has proved inelastic under tension. It was created by the present administration and violated by the present administration.

In General

The American Government is now an operator of every type of ocean-going vessel afloat. It can therefore prove or disprove statements made by experienced ship operators by organizing a department whose duty it could be to ascertain, ship by ship, and voyage by voyage, the exact difference in cost of operation of American ships as compared with those of foreign nations, due to causes inherent in our political and economic policies which the American shipowner cannot possibly overcome. Pre-war statistics will gladly be made available to such a government department by American shipowners having had operating experience with both American and foreign ships. The remedy will be up to our Washington legislature, because our Government is now the largest operator of American ships in the foreign trade, and normal ocean conditions will eventually make it a great loser. No experienced American ship owner will buy ships from Uncle Sam at the present inflated prices and attempt to operate them in international competition when the war is over. It means Irish dividends until Washington has met our shipping handicaps. A large corporation, such as the International, may attempt it, in the hope that their profits in other directions will more than offset their ship operation losses.

(Continued on page 82)

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The National Magazine of Shipping

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WE very much regret to record the sudden death on October 11 of our Editor, Mr. Frederick M. Dickie. Mr. Dickie had been with us for over four years as Editor of the "Pacific Marine Review" and had created for himself friends innumerable throughout the world. Our readers are well aware of his exceptional ability as a writer on many varied topics covering all phases of a ship's career. His work covered marine architecture, marine engineering and ship operation, with all the legislative, insurance, and terminal facility problems that pertain to this complex subject. Discussions on these various subjects require a master mind and Mr. Dickie undoubtedly possessed great genius. His loss is indeed a very great one to us all.

What was remarkable about Mr. Dickie was his utter lack of egotism, his wonderful willingness to help everyone calling upon him for assistance of any kind at any time, the painstaking care he exercised in the execution of his work, to which he gave his best, for his whole ideal was to serve, and his absolute devotion to all that was good and uplifting in life. Mr. Dickie's character was the most admirable. It bespoke humility, loyalty to country and friends and entire unselfishness. He asked nothing—he gave all. He did more than his part to make the world a brighter, better and more interesting place in which to live and his inspiring influence will not soon be forgotten.

IMPORTANCE OF IMPROVING OUR MARINE TERMINAL FACILITIES

SAN FRANCISCO is rapidly waking up to her foreign trade possibilities. One of the most important links is her waterfront. San Francisco finds that her splendid and highly im-

proved waterfront is a weak link in her chain of communications and has determined to remedy her great defect—lack of handling equipment—as quickly as possible. Plans are now being drawn up for fitting three of the wharves with double-decked transit sheds and some sort of freight-handling equipment.

The Pacific Marine Review is seeking to aid this port improvement in every way and our present issue contains two articles on this timely subject, both from the pen of Mr. H. McL. Harding, former president of the Society of Terminal Engineers, who has visited and studied all of the principal ports of the world with their facilities for handling freight. Other articles will follow from time to time with the object of securing proper terminal facilities for all of the fifty-four wharves now finished at San Francisco, as well as those contemplated, also the construction of warehouses properly fitted with machinery and in fact the complete modernization of the port.

With the United States building a merchant fleet of 25,000,000 tons, or about half as much as the whole world had before the war, the eyes of shipping men are turned toward the development of trade, and the construction of port facilities that will accommodate these ships. Vast preparations are necessary if we are to equip our ports on the Atlantic and Gulf, as well as on the Pacific, so that ships will be properly encouraged to bring us their cargoes to discharge efficiently and with dispatch.

Wharf congestion has become serious and is delaying freights. For this reason the harbor authorities have been able to secure priority orders for equipment. The question of terminal facilities is one that cannot be lightly treated, for on this depends the future, to a large extent, of our foreign trade. If we are to compete with the principal shipping nations of the world for the trade of the world after the war, we must be prepared, not only with ships, but with facilities for loading and discharging these ships at our different important ports. And after all, the importance of the port of the future will be commensurate with its port facilities—shipping flows to the port where the greatest attractions are offered it, and the size and success of the great ports that are to be developed within the next few years will depend on the preparations that are now being made to attract the great ships of our own and foreign countries to take advantage of the facilities offered them.

The Pacific Coast Association of Port Authorities held its fifth annual convention at Los Angeles on October 8th to 10th, and this all-important subject of improved port facilities, necessitated by the changed conditions brought about by the war, and how best to provide for the great fleet which the United States Shipping Board is building, was discussed at length.

The problem of improved port facilities should be studied earnestly and diligently by the shipowners and harbor boards of the entire Pacific Coast, for plans prepared now and executed at the earliest possible moment will prove a boon to the port having the perspicacity necessary to formulate these plans at the present time and the determination necessary to carry them out. The commercial relations which will be attracted by a port having this foresight and determination will reduce to a negligible factor any expense now involved in creating the necessary improvements.

"Shall We Have an American Merchant Marine?"

By Jos. J. Slechta

IN our October issue we published three letters from Mr. Jos. J. Slechta which had appeared in the New York Journal of Commerce. The views expressed by Mr. Slechta in those letters as to the future of American shipping have caused widespread comment, and we are glad to have the opportunity given to our readers of a further acquaintance with this shrewd traffic manager. While we do not share the pessimism expressed in his prophecies, we feel that the facts and deductions presented in his argument are worthy of the greatest possible attention from all those who wish to see American The Great Peace-Time Power on the High Seas.—Editor's note.

If my deductions appear pessimistic, or should I depart too far from conventional war-time optimism, I ask that it be attributed to my zeal in searching out the truth rather than to the absence of patriotic fervor.

Human nature being fundamentally selfish, man's interest is primarily in himself. Those who lend their labor, brains or capital to any business enterprise, and shipping is no exception, invariably ask but this one really vital question, "What is there in it for me?"

Let no one suppose that Americans will adopt the seafaring life, in peace time, merely to sustain the glory of the flag, or in response to the thrills of romance popularly associated with the seaman's life. Men of England, Scandinavia and Germany go to sea in large numbers because it frequently offers the only means of livelihood. In this country, on the other hand, industry and commerce ashore offer opportunities which quite eclipse those open to seamen.

Men with executive ability and competent to direct the affairs of shipping concerns, will not accept smaller salaries than offered in other lines, nor will American capital seek employment in shipping unless the return offered is as great, if the risk be equal, as in other enterprises.

It is improbable that comparative standards of living in the industrial nations will be greatly changed as a result of the war. The conditions which have in the past enabled owners of British,

Scandinavian, German, Japanese and other foreign tonnage to build and operate cheaper than can be done by owners of American tonnage, are certain to have a similar effect after the war.

Seaman's wages on British vessels, as true of every line, have increased materially. The cost of constructing and operating tonnage under the British flag, for example, is now more than double that ruling before the war, while the ratio of increase has been quite as large, if not larger, for American tonnage. First-class steel cargo carriers are now being contracted for by British builders at \$120 per ton of cargo capacity against a cost of from \$55 to \$65 per ton before 1914. American yards cannot now produce similar vessels for less than \$200 per ton and probably the average cost is nearer \$215 per ton. Ship repairing, always excessive in cost here, is now fully 80 per cent higher in American yards than in England, Holland or France.

If the program now framed by the Shipping Board is carried out—an accomplishment wholly contingent upon the duration of hostilities—America will have upon the high seas at the end of 1920 a total of about 20,000,000 tons deadweight of overseas carriers. (Consideration is not given in these estimates of tonnage to inland or coastwise carriers.)

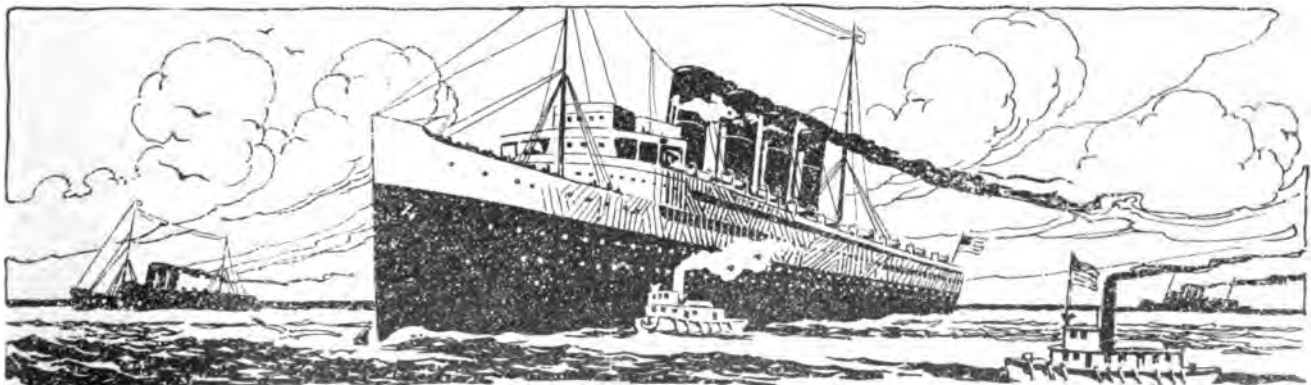
America's Great Opportunity

It is not likely that during the same period British yards can exceed their present average output, and the same is true of other European builders. In view of the very heavy losses to which submarines have subjected British tonnage, it is doubtful if the total deadweight capacity of Britain's shipping other than coastwise carriers will exceed the figure mentioned above. Probably the total available to the rest of the world will not much exceed another 20,000,000 tons. It is possible, therefore, that we may, within the next two or three years, possess American tonnage equal to one-third of the total merchant fleets of the world.

The total tonnage of vessels of the types used normally in international shipping will not be much if any less than the total available when the war



Mr. Jos. J. Slechta, Traffic Manager, Gaston Williams and Wignmore Steamship Corporation



broke out in August, 1914, or about 60,000,000 tons deadweight. But the changes in the relative totals of tonnage owned by the respective maritime powers will be sweeping indeed after the war, especially in America and Great Britain. Of the total before the war, Great Britain controlled approximately 40 per cent and the United States less than 5 per cent. At the end of 1920, should war continue to July, 1920, Great Britain is not likely to control more than thirty per cent, with the United States in possession of almost an equal amount.

Assuming that ship building continues to gather momentum in this country for at least two years more, the supply of tonnage available for overseas transportation will then be approximately equal to that in existence in 1914. Any anticipation of the probable course taken by the Government in operating or turning the Shipping Board fleet over to private control, must take into consideration the probable demand for tonnage, in proportion to that which prevailed before the war.

The period immediately following demobilization will not witness a commercial interchange of commodities in any degree commensurate with war-time traffic in merchandise and armies. The complete disorganization of peaceful industries, the uncertainty and doubt which are bound to limit activities in all but absolute necessities, must perforce affect profoundly the volume of international trade for years to come. With a tonnage supply at least equal to that in use before August, 1914, the demand for space in ocean carriers will not be as great when demobilization is completed, as in the years immediately preceding the war.

Vital Influential Factors

The volume of purchases abroad by any nation is distinctly limited by the per capita purchasing power of that nation's population. Wealth alone can give purchasing power and the war has destroyed a large part of the world's wealth. Renewal of purchasing power can therefore be effected only by re-creation of wealth. Every nation whose resources have been depleted by war must seek to rebuild its national wealth by the utilization of its own undeveloped resources. There will be a large demand for raw materials, but each nation will strive to use its own. A revival of international exchange of manufactured products in any degree approaching that which existed before the war is improbable.

Even among those nations whose wealth has not been seriously affected by war, there must be a relatively decreased power to purchase by reason of the greatly increased cost of production. It has become apparent that wages in all the industrial nations will have advanced to a degree unprecedented. That there will be adjustment downward

eventually is perhaps inevitable, but the process will require many years. In the meantime, the demand for manufactured goods in South America, Asia and Australasia will be lessened by the inevitable consequence of prices higher than those which ruled before 1914.

The writer is therefore convinced that the volume of world trade after the war will be less than before it began. But granting that it will not be less, we are still confronted with the fact that there will be, in all probability, as great a tonnage for its transportation as was then found necessary. What may we reasonably expect the earning power

of ocean tonnage to be? Unquestionably it will be determined by the competition of owners, as before. In early 1914 the time charter rates for cargo carriers ruled at about \$1.20 per deadweight ton per month. This rate represented a moderate return on tonnage which cost not to exceed \$75 per deadweight ton to build, fully equipped.

Figuring Tonnage Earning Power

After peace has come and tonnage is released from war service, will earning power be determined by the cost of tonnage, or will the value of tonnage depend upon its earning power? Because an American owner holds tonnage at book values of \$250 per ton, will a prospective charterer pay him more for it than a Dutch or Swedish steamer, if he can secure the latter at a lower figure? I think not. A second factor which will determine tonnage values then, as before, is the replacement cost. No prospective purchaser will pay the U. S. Government \$250 per ton for a used vessel if he can place an order with a British or Swedish builder at \$200 per ton for a new vessel. No shipper of American exports can be expected to engage space at \$20 per

ton in an American vessel if the British carrier is offering it for \$15 under equality of circumstances.

This country must choose one of two alternatives if public policy demands our large participation in the ocean-carrying trade. First, we must reconstruct the entire body of our laws which apply to merchant ship operation, and formulate a policy designed to treat shipping as an enterprise wholly unaffected by the economic and industrial factors which control all purely domestic activities. Second, we must in some way place upon the public exchequer the financial burden of maintaining ships upon the high seas in competition with owners of foreign vessels whose costs of construction, maintenance and operation will assuredly be less than those to which owners of American tonnage will be subjected.

If the first alternative is adopted, American capital must be allowed to buy or build in such markets as afford the best bargains. Operators must



be privileged to hire their labor without restriction from labor organizations or legislation designed to protect them. America may properly control and modify conditions for the employment of labor on American ships, but it cannot control either the economic or political conditions which affect the operation of competing ships. To attempt to do so would assuredly arouse the enmity of our international friends no less than of our enemies.

To further place American tonnage on an equality with foreign vessels in cost of operation, opportunity must be given owners to import free of duty ship's parts and building materials required for both construction and repair. We must go further! When it is apparent that subsidies in whatever guise are offered to foreign owners by their respective governments, thus tending to place American owners at a disadvantage, equivalent subsidies or bonuses must be allowed by this Government to American owners.

If the second alternative be chosen, the Government must determine the difference in cost of maintenance and operation due to higher wages, costlier material and provisions, higher prices for American-built tonnage and other disadvantages beyond the control of owners, and provide the necessary revenue by taxation so to subsidize American shipping as to place it on at least an approximate equality with the foreign tonnage providing the most severe competition on the world's trade routes.

The Prime Pre-Requisite

No middle ground or compromise is possible, unless we shall be content to keep the vast fleet accumulating to meet the present emergency, without business to occupy it. This nation is now confronted with a situation which may be fraught with humiliating disillusionment.

The writer freely commits himself to the prediction that unless one or the other of these provisions is adopted, the Government will be compelled to sell the tonnage to the highest bidder, be he American or competitor. There would be retained only such tonnage as the public interest required as a necessary feature of any well ordered program of national defense.

The operation of a great fleet of cargo carriers in world trade is similar to a gigantic chess game, with a greater number of complexities involved in the successful manipulation of the "pieces" on the board, which consists of the world's map of trade routes.

If an owner of large fleets wishes to avoid losing his "pieces" by unsuccessful competition, he must follow closely the trend of the world's markets for leading commodities, the crops and production in various countries, and the consequent course of demand and supply. He must also be able to correctly anticipate these factors for months in ad-

vance. When he has done this he is still doomed to an early "checkmate" if he cannot meet the quotations made by competitors for transportation on the routes which he may choose for his vessels.

It may be that the old order is now to disappear, and that our greatest competitors must henceforth share domination of the high seas with America.

Conditions which made competition impossible have in the past prevented capital from engaging in the operation of American merchant ships on an extensive scale. Unless conditions of the future enable us to compete successfully with foreign operators, our new-born fleets will disappear as suddenly as they are now being created.

If the American Government does not wish to sail an uncharted sea in its formulation of policies for an American merchant marine, it will not neglect to give first consideration to the prime pre-requisite to success, which is the assurance of a fair profit.

There is reason to believe that the men of large experience directing the various activities of the Shipping Board fully appreciate the difficulties to be encountered, and it is to be expected that they will face them without equivocation or evasion of the issues.

A MARITIME CONGRESS— WHY NOT?

In our April, 1917, issue the leading article under the above caption suggested getting together representatives from all the shipping interests of the maritime States of the Union in a congress to consider the future of the American Merchant Marine. This suggestion we then considered practical and timely. We consider it to be more practical and more timely now than it was then. There is no doubt

that the maritime sentiment and thought of a majority of the American people has changed during this war in a very radical way. The transport overseas of large bodies of troops, composed of young men from our great interior States, and the publicity given the shipbuilding programme, has made practically every State a waterfront State in human interest and direction of vision. With the close of hostilities all men in the interior will return with more intensive interest than ever to the humdrum business of making a living. A congress of shipping men now would have focused upon it the interest of the entire nation. Such a congress, representing at this time a unified action of all shipping interests, could, we believe, direct marine legislation in Congress along sane, practical lines and solve the future of our overseas shipping.





THIS plant, situated on the south bank of the Oakland Estuary at the east side of Webster street, covers approximately 75 acres. The entrance from Webster street was very carefully designed to efficiently handle a large force of employees. A court 100 feet wide was paved with heavy concrete and 20-foot concrete sidewalks were laid down on each side. This court extends from the street 400 feet easterly to the checking-in booths. These booths are arranged on a long curve approximating a semi-circle and are 42 in number, divided into groups for the employees of the various departments. So perfect is the system that in about twelve minutes with absolutely no congestion 9000 men are checked in.

The whole appearance of this entrance court is very pleasing and is further enhanced by two massive brick columns supporting large electroliers.

The office building, a two-story modern frame structure, 100 by 150 feet, is located on the south side of the entrance court. The upper floor contains drafting rooms, restaurants for executives and office force and rest rooms for women employees. The lower floor is used for accounting and administrative purposes.

The stores department of this plant is a very complete and efficient organization. This department has charge of handling all materials entering and leaving the yard and of all launches and barges operating between the Alameda works and the San Francisco works of the Union plant. They are housed in two office buildings 30 by 150 feet and 36 by 112 feet, respectively, and have a large warehouse 96 by 225 feet with mezzanine floor on each side and a 20-ton electric crane operating its full length. A separate division of the stores department, known as the material department, is housed in one of these buildings. The function of this organization is to keep in touch with all needed material. They must secure deliveries, follow up shipments and act as a clearing house for the material needed in all departments.

If you are waiting for a chisel or a stern frame, or a rivet or a windlass, ask the material department—they will know all about it.

A pneumatic hose storehouse, with machinery and facilities for repairing air hose, occupies a building 50 feet by 50 feet. Another warehouse, 46 feet by 75 feet, is used exclusively for storing shipfitters' templates.

The plate and shape storage yard has a capacity of 225,000 square feet. This space is provided with steam cranes, electric cranes, cantilever and gantry cranes and storage racks for every size and shape needed. Steel handled varies from one to thirty carloads per day.

The plate shop is a steel reinforced concrete building, 430 feet long and 101 feet wide, the upper floor of which is entirely devoted to the mould loft. All the laying of the lines and service board work as well as template work is done in the mould loft. The west end of this building is occupied by the angle and furnace shop cupied by the angle and furnace shop with oil-burning furnaces and bending is about 1900 tons of steel a week. It is equipped with all the modern plate shop machinery. All the plates are handled by overhead trolley cranes running the full length of the building. After the plates and shapes have been worked, they are assembled in a space between the building slips and the plate shop, or immediately in front of the building. The plate shop is so situated that the material from the storage racks is laid out, passes through the plate shop, and is worked and erected in one continuous movement from storage racks to assembly of hull.

There are now completed six building ways fully equipped for the construction of the largest type of steel vessels. Slips are well equipped with elevated electrically-operated traveling cranes, as indicated in photographs. Four of these ships are located immediately in front of plate shop and two are on the east end of the plate shop. Slip ways have been laid out and designed for launching



Mr. J. J. Tynan, whom Charles M. Schwab proclaims "the greatest shipbuilder in the world."



Plate storage yard

vessels of the largest size with ample depth of water for launching.

The plant is well equipped for handling repair work, having one 4000-ton and one 2000-ton capacity Crandall marine railway and one floating dock of 3000-ton capacity.

The machine shop is a fire-proof reinforced structure—probably the most modern, up-to-date machine shop on the Pacific Coast. This machine shop was designed by Mr. Frank Neitzel

after a thorough investigation of some of the most modern machine shops in the country. It is 170 feet wide by 560 feet long, and is equipped with a mezzanine floor for small tools. It is equipped with the most modern crane facilities, having eleven electrically-operated cranes, two 40-ton and one 60-ton crane in the main bay, and two 5-ton cranes on each side of the shop on the mezzanine floor and two 10-ton cranes on each side of the main floor. The main floor is of heavy reinforced concrete, faced with 6-inch redwood treated blocks throughout. As noted in the photographs, the shop construction presents an almost uninterrupted space of windows, the pillasters being heavy steel col-



Mary Pickford addressing the men at the Alameda Works, stimulating subscriptions to the Fourth Liberty Loan



Fabricating Park at the Alameda Works of the Union Plant, Bethlehem Steel Corporation, Ltd.

umns faced with brick and the windows so arranged as to give the maximum light and ventilation, eliminating all dark corners. The lavatories, elevators, wash rooms, lockers, etc., are all located on the outside of the building, giving an unbroken interior. This machine shop is equipped with the most modern set of machine tools and appliances for the building of reciprocating engines, steam turbines, reduction gears, etc.

The marine fitting-out shop is a 160 x 200-foot, two-story steel reinforced building of the most modern type of construction. This building houses the pipe fitters, marine machinist shop and copper and tin shop. The location of the building is so that it is most admirably adapted to the fitting out of the ships. This building contains a modern, well-equipped tool room. Elevators are located in the building for the handling of the material to the second floor. Provision is made in the marine machinist's department for lockers in the upper floor. It also has provision for lockers, etc., for all classes of men employed in these departments. As noted in the photograph, the windows are so located as to give maximum light.

The blacksmith shop is a frame building 72 by 100 feet, containing the necessary steam hammers, forges, furnaces, etc., for the making of machinery and all necessary forgings which pertain to ship-building.

The joiner shop and mill is a two-story frame building 60 by 160 feet, all machinery being on the first floor with joiner shop on upper floor.

The compressor house contains eight Chicago pneumatic electric air compressors, each of 2212 cubic feet capacity, and is also the distributing station for the electric lines throughout the yard. The building is a first-class steel frame brick struc-

ture and presents a very pleasing appearance and is surrounded by well-kept lawns.

The company has recently installed gas for use in rivet forges, etc., which is furnished by the Pacific Gas & Electric Company through a pipe line across the estuary and into the gas house, where it is converted by the Selas system for use in the forges. Some advantages of gas are cleaner forges and release of the compressed air that is necessary in oil forges.

The electric shop occupies a space 52 by 150 feet of a large two-story reinforced concrete building. This department takes care of all electrical energy used in the works.

The employment office occupies a building 36 by 70 feet. Every man hired or terminated passes through this office. Its function is to supply men for all departments and in the event a man misfits to find a place where he will fit. This department also cares for all exemption claims, and employees having real or fancied grievances are invited to avail themselves of the services of this department, where they will receive prompt and courteous attention and adjustment. In fact, the object of the employment office is to give service to both employer and employee and to make the employees feel that the company has their welfare at heart.

The Cafeteria is housed in a frame building 120 by 180 feet, situated and equipped for the handling of some four thousand men in forty minutes. This is under the management of Mr. Hoedentaker, formerly of the Palace Hotel in San Francisco, and the aim and object of the company is to give the men a first-class meal under the most sanitary conditions at cost.

The hospital department is presided over by Dr. Emerson Emergency Hospital, in the yard, occu-



Above is pictured the laying-off park at the Alameda Plant, while the lower photograph shows the new machine shop, which is one of the finest on the Pacific Coast. Especial mention might be made of the excellent lighting facilities in this building, as well as the unique arrangement of outside locker rooms, which leaves an uninterrupted floor space on the interior.



A part of the plate storage yard, showing gantry cranes and plate shop with mold loft above in the background. The lower photograph shows the new marine fitting-out shop

pying a one-story frame building 28 by 41 feet, with doctor and nurses in constant attendance night and day, where all patients are given immediate attention. For the more serious cases a ward is reserved at the Merritt Hospital.

It will be a great satisfaction to every man employed in the Union plant to know that the country at large is now recognizing the ability of their general manager and that their plant is being acclaimed in the eastern newspapers as a model of accomplishment and efficiency that others would do well to copy.

This feeling should be all the greater because while Mr. Schwab gives the credit to General Manager Tynan, the latter passes it along to his "boys." Co-operation is the real secret of the success of the Union plant. The thousands of employes, to the last man, have answered the call of patriotism with the best that is in them. They have stood solidly behind their general manager in the past and are standing as solidly behind him today. Results are their answer to the German Kaiser's defiance of the rights of mankind.

Only recently, General Manager Tynan told a gathering of business men in the East that world's records in ship construction could easily be established by any shipyard if they had the right kind of men on the job. "The success of the undertaking," he said, "was governed solely by the loyalty and efficiency of those doing the actual work. It is the men behind the machinery, not the mechanical perfection of the machines, that break records."



Miss Josephine Tynan, Mrs. J. J. Tynan and Miss Mary Pickford. This photograph was taken during Miss Pickford's recent visit to the Alameda Works, when she conducted a successful drive for the sale of Fourth Liberty Loan Bonds



By Special Correspondent

Another Seattle shipbuilding plant has entered upon a campaign calculated to bring it shortly among the speed plants in the country. The Seattle North Pacific Company on September 28th launched the hull of its first ship, the 9400-ton "Ozette," just eighty-four working days from keel laying, a feat recognized by the United States Shipping Board as never before having been equalled by a new shipyard on its first product. This feat is a notable one and was accomplished mostly through the energy and organization ability of former General Manager J. E. Sheedy and Superintendent of Hull Construction Thomas Scott Neilson. When "Tommy" Neilson received congratulatory telegrams from Messrs. Piez and Schwab of the Shipping Board, he promptly replied that his men would put three more vessels of this type in the water before January first, and maintain a mark of at least one vessel a month from this four-way plant during the remainder of the Shipping Board program. Mrs. C. J. Erickson, wife of the founder of the plant, acted as sponsor for the first ship, and moving pictures of the event were shown at a local theater the same night of the day the ship was launched. Following the theatre party the officials of the company, including General Manager John D. Twohy and Superintendent Neilson, were en-

tertained at the Seattle Press Club, which organization, following a policy of honoring local shipbuilders, is to hold a J. F. Duthie night next month.

Some idea of the enormous increase of the business transacted at this port by the Nippon Yusen Kaisha (Japan Mail Steamship Company) may be had from the published announcement of the payment by this concern to the United States Collector of Internal Revenue for this district of \$1,240,000 as excess profit and income tax for the past year. A check for this amount was recently written by Mr. F. M. Studley, Seattle manager of the N. Y. K. In the past year the Nippon Yusen Kaisha has replaced the old antiquated Oriental liners formerly plying out of this port with eight handsome, big, completely modern equipped liners that compare favorably with anything crossing the Pacific. It is now said that even these new palatial vessels are not adequate to accommodate the demands of the service, and that the N. Y. K. will soon have even a larger type of ships on the route, though the present fleet ranges in size from 14,000 to 20,000-ton craft. In addition to the eight passenger liners the N. Y. K. operates about a dozen tramp vessels in the service. So great has been growth of their business at this port that the Great Northern dock at Smith Cove is now unable to handle all the cargoes, and arrangements have been made by the company for the use of facilities at the Port of Seattle's publicly owned terminals.

On the afternoon of September 21 the Elliott Bay Shipbuilding Company of Seattle, a firm building wood auxiliary powered schooners on private account, launched its first product, the schooner "Trolltind," undertaken for Norwegian interests.

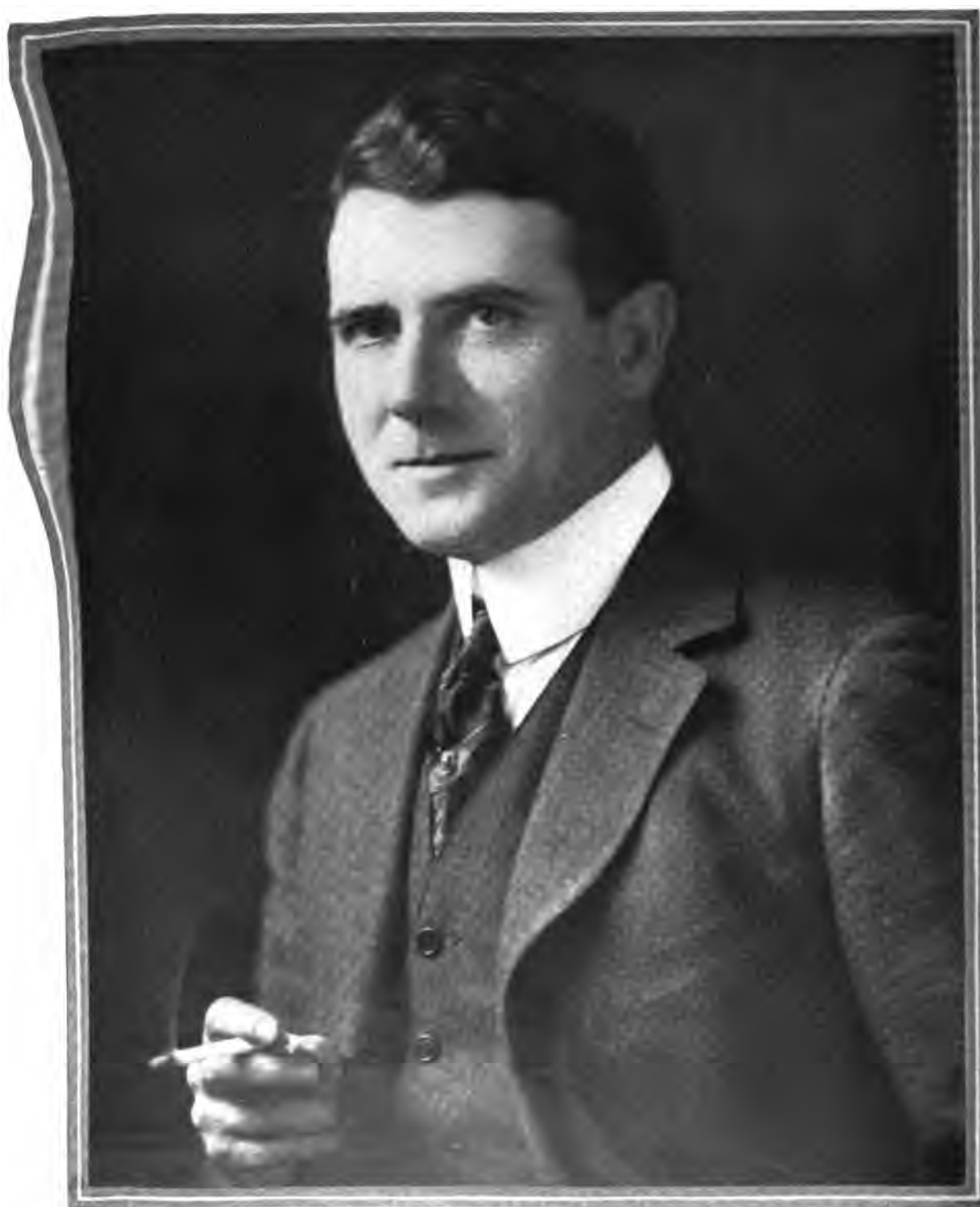
Mrs. Clyde O. Morrow, wife of the vice-president and general manager of the plant, acted as sponsor. Mrs. Morrow is the only woman manager of a shipyard in the Northwest, she being the sole owner of the Elliott Bay Yacht & Engine Company. She is also a heavy stockholder in the Elliott Bay Shipbuilding Company, but her pet hobby is the smaller plant, over which she presides without any assistance expect from the employees.

On Saturday night, October 5, the Washington Wood Shipbuilders' Association tendered an informal dinner to Capt. Blain at the new Washington Hotel, where over one hundred members of the organization and a number of invited guests greeted the new district manager.

In connection with the new port project at Smiths Cove, a controversy has arisen over the suggestion that a name be selected by which the new pier may be distinguished from other wharves extant at that waterway. Many suggestions have been received by the port officials as well as by the newspapers of Seattle, and the majority of them indicate a d-



Mrs. Clyde O. Morrow, who acted as sponsor for the S. S. "Trolltind"



Mr. J. E. Sheedy, former Manager of the Seattle North Pacific Shipbuilding Company, who was directly responsible for the splendid record made on the S. S. "Ozette"



Scene at the yard of the Ames Shipbuilding and Drydock Company, Seattle, showing the "West Mead" and "West Cape" at the fitting-out docks

sire that the new terminals be called after the late General H. M. Chittenden, first president of the Port of Seattle Commission, and who is credited with having planned the scope of the present water terminals.

John T. Humphrey, for several years chief clerk and statistician under Manager Robert C. Hill of the Seattle Merchant Exchange, died at his home in this city October 11 after an illness of several weeks. Mr. Humphrey was one of the best-liked men in Seattle shipping circles. The splendid knowledge he possessed of ships, their destinations, ports of arrival, masters and such intimate details proved a welcome source to many interested in shipping. It will be exceedingly difficult to replace him in his position, a most exacting one.

The Pacific Steamship Company has chartered the steamship "Catherine D," one of the famous Pacific American Fisheries Company fleet, for service in Alaska during the present freight congestion in the North, and when that situation is relieved, it is understood that the vessel will be diverted to the Puget Sound-California route. The Admiral line also announces that Capt. M. M. Jensen, formerly master of the steamships "Admiral Farragut" and later the "Admiral Watson," has been named master of the auxiliary powered schooner "Admiral Mayo," and will enter the Oriental service of the company. Captain Jensen for the past twenty years has been navigating Alaskan waters, and, except for the diversion of his ship to the California route in winter months, has served in the northern service almost continuously.

With one of the most valuable cargoes of whale and walrus oil ever brought to Seattle, the power schooner "Belvedere," owned by the Hibberd Stewart Company of Seattle, arrived recently after six months cruising in Bering Sea and Arctic Ocean waters. The "Belvedere" is commanded by Capt. Karl Hansen, who reported no unusual occurrences during the long voyages, though he expressed disgust with the methods employed by the Bolshevik officials in various isolated Northern Siberian ports.

An instance reciting the readiness with which

"The men who go down to the sea in ships" respond to patriotic duty was shown in Seattle during the Fourth Liberty Loan drive when a wireless message from the master of the steamship "Cordova" reached Joseph C. Harris, assistant superintendent of the Alaska Steamship Company, asking that \$2,050 in Liberty Bonds be purchased for the crew of that vessel. Capt. C. V. Westerland, master of the "Cordova," announced that twelve men wanted \$100 bonds and seventeen elected to take bonds in the \$50 lots. When the wireless was sent the "Cordova" was in Behring Sea, and her schedule made it impossible for her to reach an Alaskan banking center where the order might have been placed, so it was decided to purchase through the head office of the operating company.

Another of the several big Japanese corporations, the Mitsubishi Corporation, is to place a general Northwest agency in Seattle immediately, according to Y. Nakatani, a representative of the concern, who is making the preliminary arrangements. The Mitsubishi Corporation and Mitsui & Company are two of the largest industrial firms in Japan, the latter having been represented here for a number of years. A subsidiary concern of the Mitsubishi Corporation is the Mitsubishi Goshi Kaisha, a steamship operating and building company which maintains a large fleet of big ocean carriers.

When the S. S. "Bellata," the first product launched from the ways of the Patterson-MacDonald Shipbuilding Company plant, was recently completed and sent to sea, a general degree of satisfaction was expressed at that shipyard. The "Bellata," a 4,200-ton wood ship, was launched last April, but her completion was retarded and delayed on account of the inability to secure the British design of engines called for in her specifications. The company had the craft ready months ago, and the same applies to four similar type ships already in the water. As a result of this delay in engines, it has been decided to equip the remaining five Australian ships on the ways with oil engines of the Semi-Diesel type. In addition to the Australian contracts the Patterson-MacDonald concern is to build steamships of the same type for the United States Shipping Board,

the first keel on this contract having already been laid.

In line with its policy to look after the welfare of its employes, the Skinner & Eddy Corporation recently closed leases for three large apartment houses, and have commenced the construction of a fourth. These apartment houses are to be devoted exclusively to employes of the big plant, in this way solving the housing problem for many of them.

Capt. James J. Doyle, formerly a well-known Puget Sound pilot, and later a special watchman at the J. F. Duthie & Co. plant, has just returned to Seattle, after having been submarined while an officer aboard the steamship "Westover," which was sunk by a U-boat July 11 last. Doyle is now a naval lieutenant, and is spending his leave at his home in this city. While attached to the Duthie plant Captain Doyle had a longing to return to sea, and having watched the progress of the "Westover" from keel laying to completion, he applied for and was accepted as first mate of the ship under Captain Alexander F. Ogilvie. On arriving at the Atlantic base both he and Ogilvie were commissioned in the Navy. Captain Doyle is unabashed by the hardships encountered following the sinking of his ship, and is anxious to get back into the service and have a crack at the divers once more. All this despite the fact that he was offered a pension and retirement on account of his age.

Demonstrating that Seattle's publicly owned terminals are self-sustaining, the Port of Seattle Commission recently rescinded its previous action in deciding to ask for \$110,000 by tax levy.

The sincere sympathy of the many friends of Mr. and Mrs. Frank Walker is being extended over the death of their second son, Eric Francis Walker, a former Queen Anne High School student and athlete of this city, who was killed in France, August 27 last, while fighting with an Australian battalion. Young Eric Walker, whose father is the Northwestern representative of the Bureau Veritas, and one of the best known marine surveyors and engineers on the Pacific Coast, went to sea when a lad of 15, and followed that venturesome career until 1915. On July 4th of that year he was in Melbourne, Australia, when a recruiting campaign was on and promptly enlisted. He went almost immediately to France and had written many interesting and expressive letters to his mother, one of which was dated August 22, this year, only a week before he was killed, and which was the last heard from him until a belated message from London informed his father of his heroic sacrifice. Eric Walker was born in China, and was 22 years of age when he died on the field of glory in France.

En route to the Orient, where he is to undertake the enlargement and scope of the activities of the Pacific Steamship Company in China, Japan and other far eastern ports, R. D. Pinneo spent a few days in Seattle during October on his return from New York. Mr. Pinneo is succeeded at the New York office by Hugh Gallagher, formerly of San Francisco. The Pacific Steamship Company, Seattle, removed its city ticket offices, formerly at 806 Second avenue, to new quarters on the ground floor of the L. C. Smith Building. As the general offices of the company are located in this building, the change brings all departments in closer contact and gives the ticket offices a very handsome setting.

OUR NEW MERCHANT MARINE—THE PROBLEMS OF ITS FUTURE EXISTENCE AND GROWTH

(Continued from page 69)

The writer has quoted Great Britain and its system quite freely in this article, but only for the reason that, prior to the war, Great Britain controlled over 60 per cent of the merchant tonnage of the world, and for a long period has practically dominated the oceans. British laws and British sacrifices have brought about that domination, and standards of living with them are secondary to loyalty and commercial supremacy. The British laws were made only after the most careful investigation by technical and competent men uninfluenced by political considerations, and based upon experience, not theory. No doubt the war has taught Great Britain as many things as it has taught us, probably many more, for that nation was in it from the beginning. Let us therefore watch and copy till we learn how. Would it not be possible after peace is declared to have an international agreement among the maritime nations covering the operation of vessels in foreign trade that conditions might become as uniform as possible, leaving only the problems of first cost, wages and standard of living to be adjusted separately by the different nations to the agreement? But such burdens should not fall as a handicap on the individual shipowner.

In the after-war normal fierce competition for the commercial supremacy of the world there will be no place for the present developed concrete ocean going vessel, the wooden steam and sailing vessel, or the steel sailing vessel. It will be the rivetless vessel with Diesel engines, and England is hot on the trail of both. What are we doing? Are we building any Diesel engines in the United States to propel a 10,000-ton deadweight ship? Would it not be wise for the Shipping Board to spend some money on Diesel engines now, so that the experimental features may have been conquered before normal competition comes to us again? We have let to discover a 1500-shaft horsepower Diesel engine of reliability built in the United States, and a 10,000 deadweight ton vessel requires at least two such engines, twin screw, to propel it at ten knots' speed. Should we conquer this, we will then only have caught up to our competitors in the latest economical shipbuilding features, and we must continue to strive for further economies and keep ahead of our competitors, or the old first cost, wages, and American standard of living handicaps will still remain with us. It will take some generations to educate other nations up to our standard of living, especially our neighbors on the other side of the Pacific.

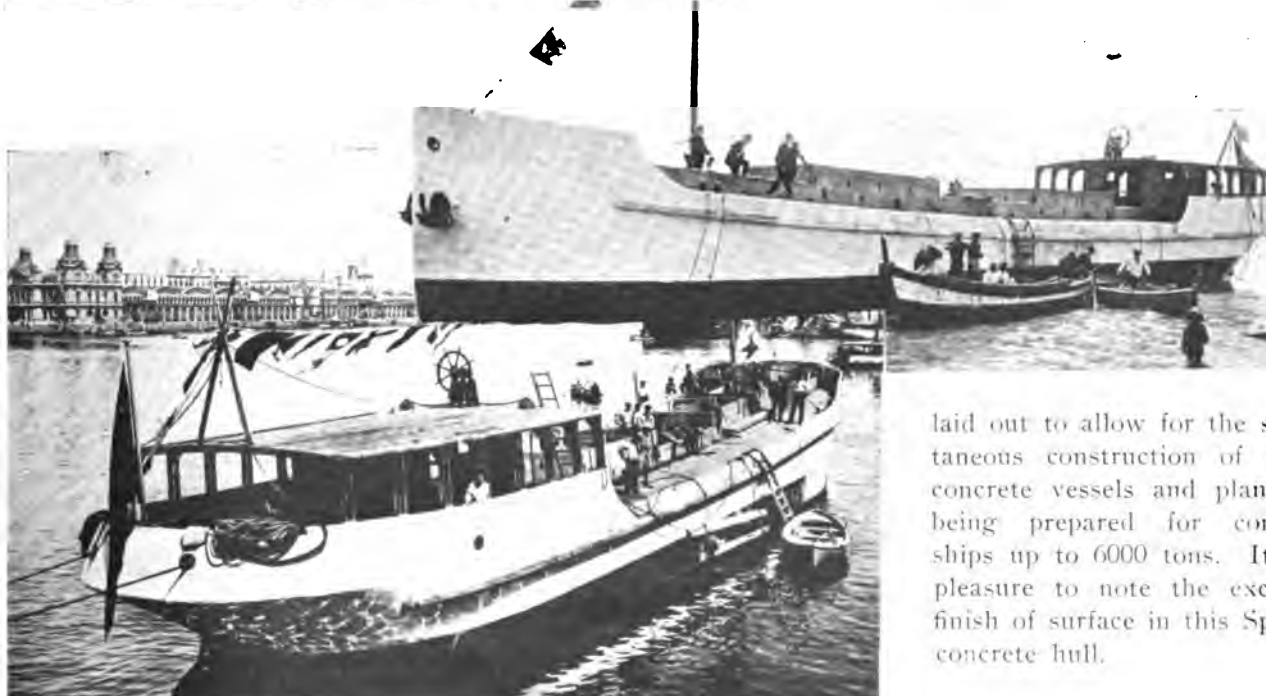
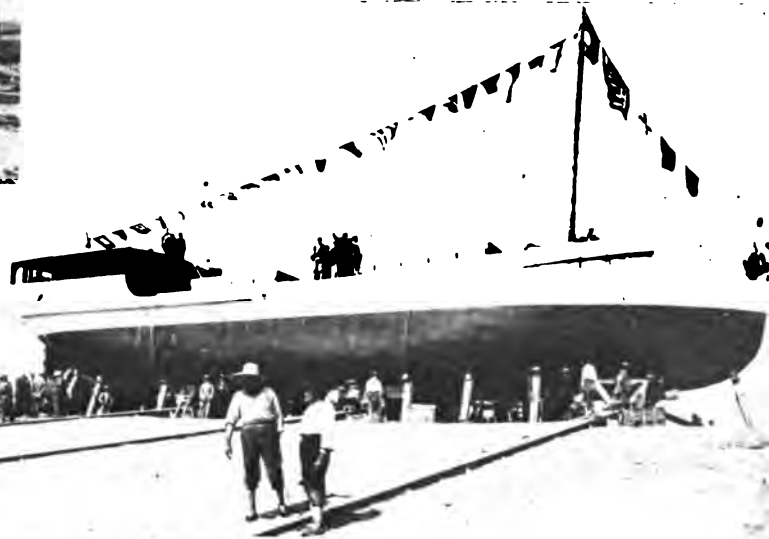
The writer, in presenting this article, earnestly hopes that it will open up a discussion our future marine problems, and who knows but that out of the various printed thoughts or ideas advanced, some solution may be found to overcome our handicaps. Now is the time to prepare for the future.

Concrete Construction



The first Spanish reinforced concrete ship was built at Barcelona by an engineering-contracting firm of that city known as Construcciones y Parimentos. This vessel was launched a few weeks ago and shortly afterwards made a highly satisfactory trial trip.

In preparation for the construction of concrete vessels on a large scale, Construcciones y Parimentos secured a fine site for extensive yards at Malgrat, Spain, with a frontage on the Mediterranean of over 6000 feet. Here a shipyard has been



laid out to allow for the simultaneous construction of thirty concrete vessels and plans are being prepared for concrete ships up to 6000 tons. It is a pleasure to note the excellent finish of surface in this Spanish concrete hull.

MOORE SHIPBUILDING COMPANY



AT the beginning of 1915, the plant of the Moore Shipbuilding Company consisted of three buildings, an office and pattern loft, a mill, pattern and joiner shop, a machine, blacksmith and punch shop. One slip way, capable of carrying a vessel of 2000 tons and served by gin poles, completed the yard. The equipment of the shops was very limited and only small repair work could be undertaken.

With the emergency call for ships, the Moore Shipbuilding Company began to make ready for growth. Ground was secured on the three sides of the plant and a modern, fully equipped steel shipbuilding yard began to take shape on the Oakland side of the estuary. Crossing the Western Pacific main line tracks at the foot of Adeline street, we find ourselves at the main entrance of this yard. Here is located the check house for employees, a building 273 feet long with accommodations for time-keepers on the second floor. Sufficient checking in capacity is provided to take care of any possible requirements in that line. A garage building 120 feet long, located at this entrance, provides for automobile convenience of the officials and government inspectors. On the left of the entrance is the office building, 40 by 150 feet, two stories in height, with an addition 60 by 80 feet,

three stories in height. In this latter part are located the executive offices on the first floor, the drafting room on the third floor, and the blue printing and photography department on the roof. The balance of the office building is used by the clerical and accounting force. A concrete vault 20 by 40 feet, extending up through the three stories, provides fire-proof storage for all records and drawings.

Spur tracks from both the Western Pacific and Southern Pacific main lines run into the yard, so that material is delivered directly to the storage racks or the warehouses, where it is sorted and distributed by travelling cranes and gantries.

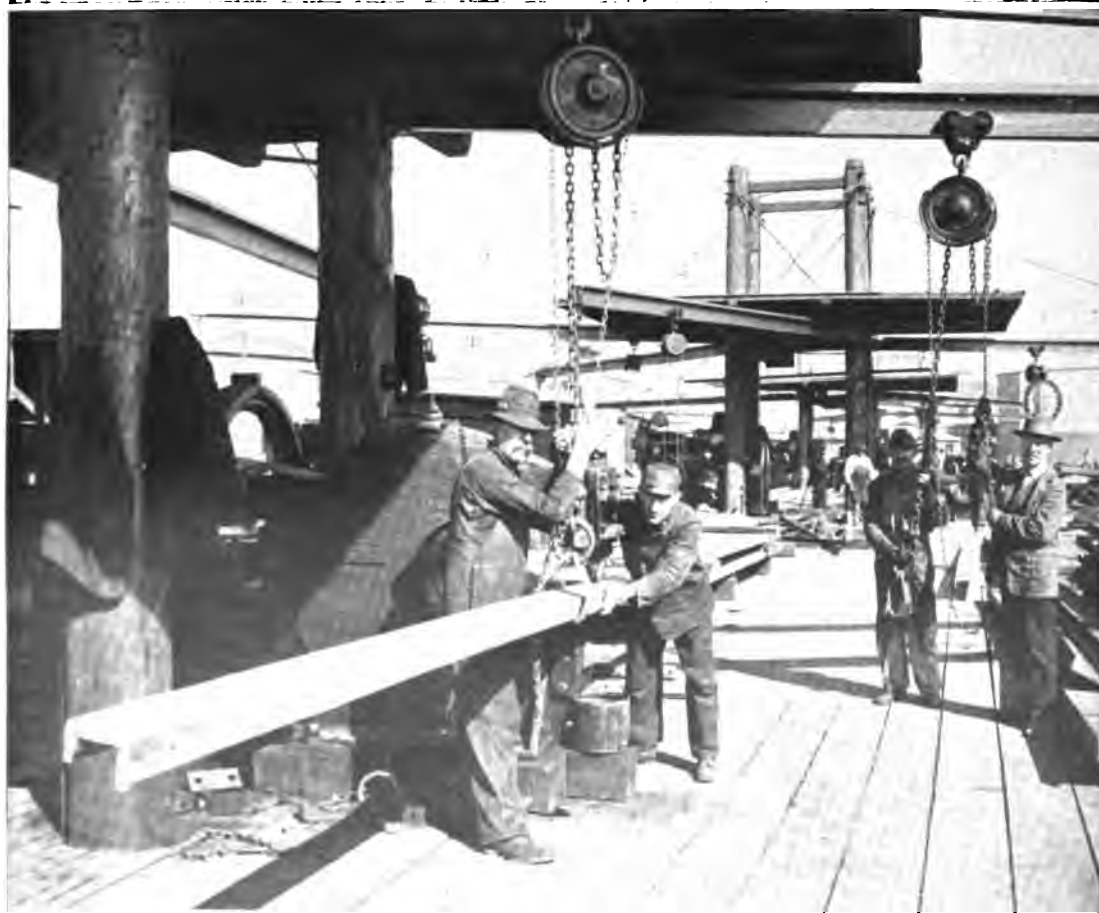
The machines for working up the shapes are located in the open alongside the angle iron storage racks and are served by the same travelling crane that unloads the cars. The following list shows tools used in this work: Four 24-inch Wickes Brothers single vertical punches; one 24-inch Ryerson single vertical punch; one 16-inch Doty double-ended vertical punch and shear; three 12-inch Wickes and Judson single vertical punch; one 12-inch Hilles and Jones single horizontal punch; one 12-inch Cleveland single horizontal punch; two 6x6 angle shears; one 8x8 angle plainer; two Bulldozer cold presses; one hydraulic press; one high-speed Ryerson cold saw; two horizontal drills.



An excellent view of four of the ways at the Moore Shipbuilding Company



Robert F. Moore, Chairman of the Board of Directors and First Vice-President, Moore Shipbuilding Company,
to whose energy and ability is due much of the success of this company



The new boiler shop at the Moore Shipbuilding Company is shown in the upper photograph, while in the lower photo ship fitters are shown at work punching channel frames.

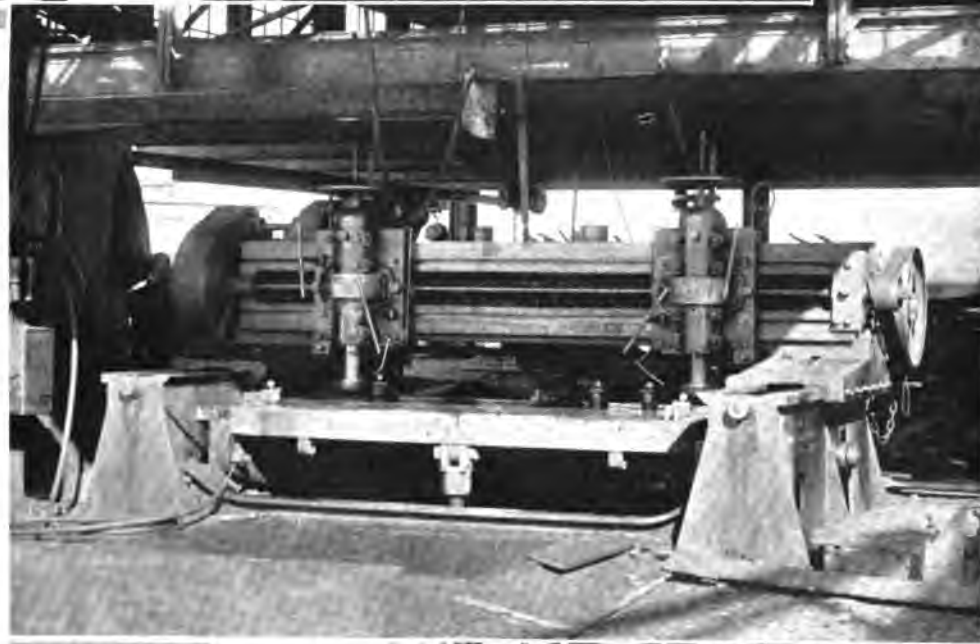


Upper photo shows the layout park with mold loft and inclined way. The lower photo shows fabricating park and shore end of building ways.



loft, so that templets are brought directly to the park by an inclined runway, and after using are stored in a building at head of park. No templet need be carried more than 300 feet from either mould loft or laying-off park.

From the park, the plates are delivered directly into the punch shop, which is 150 by 280 feet and equipped with the following tools: One 60-inch Wickes Brothers single vertical punch; one



Upper picture shows bending slabs and furnaces. Middle photo shows double scarphing machine, while in the lower photo the vertical bending rolls are shown.

Material that requires hot bending is handled by the travelling crane direct from the racks to the bending blocks. The blocks are housed in a building 95 by 170 feet and are served by two double-ended oil-burning furnaces of special design.

The laying-off park is served by a travelling gantry of the revolving type, with 75 foot tines and 260 foot travel. The park is alongside the punch shop, which is directly under the mould



60-inch Cleveland P. & S. Works single vertical punch; one 60-inch Cleveland P. & S. Works single vertical combination punch and shear; one 48-inch Cleveland P. & S. Works single vertical combination punch and shear; four 48-inch Southwark single vertical punches; three 48-inch Wickes Brothers single vertical punches; one 48-inch Hilles & Jones single vertical punches; two 36-inch Cleveland single vertical punch; one 24-inch Cleveland single vertical punch; one 24-inch Whitney single vertical punch; two 16-inch Doty double-ended punch and shears; one 30-foot plate plainer; one 24-foot plate plainer; one 20-foot plate plainer; one 14-foot plate plainer; one set 25-foot plate bending rolls; one set 16-foot plate bend-

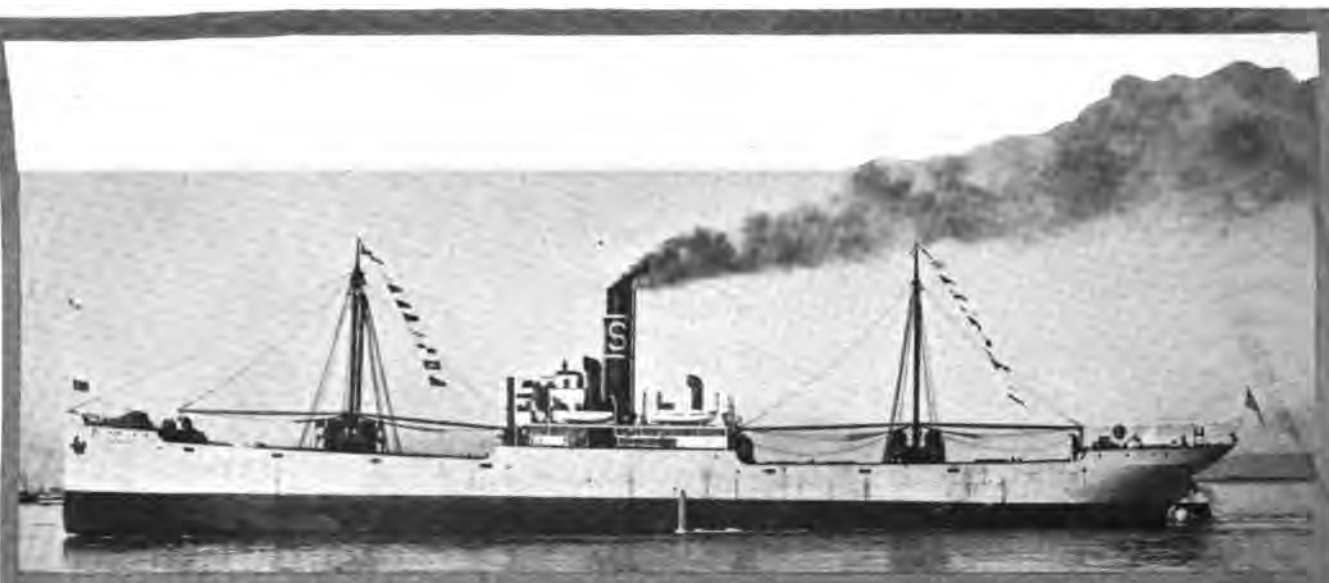


Ships at fitting-out wharves of Moore Shipbuilding Company are shown in the above photograph, while an excellent view of the molding loft is shown in the center photograph and the pattern shop interior is given in the lower picture.



ing rolls; one set 4-foot plate mangels; one taper liner roll; one 2-spindle scarphing machine; one 3-spindle scarphing machine; one horizontal drill; and three post counter-sinking drills.

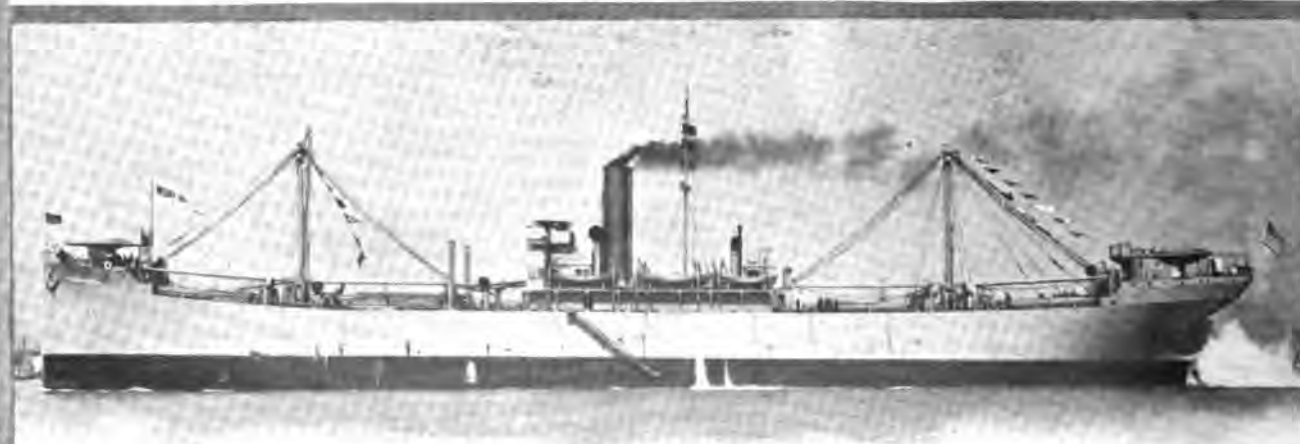
Going through the punch shop the material when ready is delivered to one of the three assembly yards, located at the heads of the slip ways. The central yard serves three slips, using two revolving cranes each, of 80-foot radius; the east yard



Showing the three types of vessels constructed by the Moore Shipbuilding Company. The steamer "Capto" is shown in the upper photograph. This vessel was built for the Rolph Navigation and Coal Company. She is 376 feet by 52 feet 3 inches by 28 feet



The "Frederic R. Kellogg" was built for the American Petroleum and Transport Company. She is 425 feet by 57 feet by 33 feet, and built on the Isherwood system



The S. S. "Pasadena" is 402 feet 6 inches by 53 feet by 26 feet 6 inches. This vessel was requisitioned by the U. S. Shipping Board, Emergency Fleet Corporation



Mr. George Ames, President of the Moore Shipbuilding Company



Mr. Joseph A. Moore, Second Vice-President Moore Shipbuilding Company

serves four slips, using two similar cranes; the west yard serves three slips, using one travelling gantry with 90-foot radius.

The assembled material is handled on the ten building slips by twenty-four stationary tower cranes. At least three of these cranes are available for use on any one slip.

The slips are built on a piling foundation capable of supporting a load of fifty tons per running foot of slip. Hulls are launched into the Oakland Estuary channel and moved alongside the fitting-out wharves. These wharves are built between the slip ways and will accommodate ten 9400-ton hulls. They are equipped with 90-ton shear legs and three stationary tower cranes. These three cranes are so located that no shifting of hulls is necessary for handling of weights up to 25 tons.

A building 90 by 220 feet, two and three stories high, houses the pattern shop, joiner shop and mill. The machine shop is 120 by 300 feet, with large bays. A 30-ton over-head travelling crane and a very complete equipment of modern machine tools are now installed in this building. All machine work necessary for new ships is finished on the ground.

The new boiler shop, 115 feet by 220 feet, is equipped with machinery necessary for all kinds of boiler work. With the increased capacity of this shop, the Moore Shipbuilding Company, in addition to the requirements for hulls built at their own yard, have taken contracts from the Emergency Fleet Corporation for 82 boilers for hulls building at other yards.

On the north end of the boiler shop is the new blacksmith shop. Here are installed heavy power hammers with sufficient capacity to work all of the forgings required for the largest ship now being built on the Pacific Coast.

The compressor houses supply the pneumatic tools. One of these is located at the marine railway and contains the machinery for working that part of the plant. In this house there are eight compressors of 11,000 cubic feet total capacity. The other house, containing seven compressors of 15,600 cubic feet total capacity, is located alongside No. 1 slip.

At various parts of the yard are conveniently located tool rooms. A marine railway of 3000 tons capacity and a floating dock of 12,000 tons capacity, now under construction, will provide ample convenience for all classes of repair work.

Spur tracks are laid to all parts of the yard and material is handled by nine locomotive cranes and one industrial locomotive. All equipment for hulls is segregated and stored in a large warehouse 50 by 300 feet, which has a compartment for each hull.

The hulls built by the Moore Shipbuilding Company during the period of reconstruction have been of three types. First, a 7100-ton freighter for the Rolph Navigation & Coal Company of San Francisco. Second, the 10,000-ton tankers, of which one has been delivered and twelve are under way. Third, a Moore Shipbuilding Company designed freighter of 9400 tons. Contracts for 36 of this type have been received. To date, twenty-one hulls have been launched.

The yard capacity can more than take care of the present deliveries of steel from the mills and the Moore Shipbuilding Company are ready to set

for themselves the programme of launching a hull every ten days and to contract for any class of ships up to 600 feet in length.

The Moore Shipbuilding Company are now prepared to fabricate 12,000 tons of steel per month and in their latest slip will be prepared to build ships of weight and length equal to the heaviest battleships now being authorized by the United States Government.

CHARLESTON TO HAVE CHANNEL

The Government's plan for giving Charleston, S. C., a channel with a lower water depth of forty feet from the Navy Yard to the sea is about to be carried into effect. The appropriation having been made by Congress some time ago, the call has been issued for the engineers and surveyors to make a survey of Charleston harbor. Once the project is actually under way it will be pressed rapidly, so that the Government can utilize the port's advantage fully in connection with the great port terminals under construction at North Charleston, the large storage depot of the Marine Corps on the Cooper river waterfront, and the Charleston Navy Yard. The channel will be 1,000 feet in width. As the tidal range is five feet, it will be nowhere less than 45 feet deep at high water and Charleston will be able to accommodate the largest and deepest vessel afloat or building. As it is generally believed that the Panama Canal will limit the size and draft of vessels for some time to come, Charleston will be equipped to take care of any of the world's ships. Charleston harbor's present low-water depth is 30 feet and the cost of deepening the 1,000-foot channel to 45 feet will be only \$5,000,000, which is far cheaper than a similar improvement in any other harbor on the South Atlantic.

Two of the six sections of the Valk & Murdoch Company's floating dry dock have been completed since work was begun last February and a third is now on the way and will be completely assembled soon. It is expected that the entire job will be finished by the end of the year. Each section will receive a vessel 65 feet long. For longer vessels, two or more sections are used together. The cost of this large repair dock will be more than a half million dollars. It will be operated hydraulically. When a ship is to be received, the necessary number of sections, depending on the ship's size, will be filled with water and sunk low enough to take in the vessel. Then the water will be pumped out by steam pumps until both the ship and the upper part of the dock are high and dry. It will be possible to repair practically any coastwise vessel in this dock and the Valk & Murdoch Company is looking forward to a large repair business as a result of the extensive addition to its plant.

On September 30 the Nilson & Kelez Shipbuilding Company, building wood ships here for the Emergency Fleet Corporation, launched its fourth Ferris type ship with Mrs. A. S. Nilson, wife of the vice-president of the company, as sponsor. The vessel was named the "Adway," the others being the "Bonnafon" and "Forster," already in commission, and the "Octarrara."



Activities in Oregon Ports

By Special Correspondent

NEW contracts of a mechanical character placed during the past few weeks in Portland insure capacity work in machine and boiler shops for a long period, while the demand for power equipment and fittings is prompting expansion of established plants and also the introduction of new firms into the field.

The Willamette Iron & Steel Works, with some one hundred and fifty-five Scotch marine boilers on its list, received an order during the present month for fifty-two additional boilers—fifteen of them being for five steel ships of 9500 tons that the G. M. Standifer Construction Corporation is to build, and twelve of them are to replace boilers previously constructed and which were sent to Puget Sound builders; the others are open to assignment. The Emergency Fleet Corporation requested the Willamette interests to make known whether they could undertake fifty boilers for Atlantic Coast ships for delivery during 1919. As the Willamette Iron & Steel Works sent word that they could handle this order without shutting off other boiler work, the Emergency Fleet Corporation immediately telegraphed to ascertain if the Willamette's force would take on one hundred boilers, just doubling the original number. This last inquiry has no bearing on the order mentioned above for the fifty-two boilers.

The Helser Machine Works obtained a contract from the Emergency Fleet Corporation several weeks ago for five hundred deck winches, to be installed on steel vessels, and early during October another lot of 300 was ordered. In addition to this Mr. Helser closed with San Francisco shipyards for two hundred more and he also obtained contracts for five hundred and fifty hawser reels.

The McDougall Overmire Company began to break ground on September 15th for a tank and boiler plant at East Water and Hawthorne avenue and before a month elapsed tools were erected in the shop and the first material for water and fuel oil tanks for some of the wooden vessels was being cut, punched and shaped. The company has undertaken to provide tanks for three ships by November 30th, and judging from the progress to date, they will not be tardy. The shop machinery was mostly obtained at Denver, where a plant was purchased and the necessary tools shipped to Portland. A few new tools had to be ordered from manufacturers, though the shop was actually working without regard to their arrival.

The Willamette Foundry Company is another concern recently established and now actively engaged in producing bronze castings for new gov-

ernment ships. The plant is located on North Front street, on property adjoining Ainsworth dock, and it is intended to carry on a general brass and bronze business.

The Emergency Fleet Corporation, through its bureau of supplies, has decided to divide its storage capacity between Seattle and Portland, and has obtained from the Commission of Public Docks a portion of the space in the main shed at the Fifteenth street municipal terminal. Use of the slip is also included and open space between the dock and shed and Warehouse B is to be covered to increase the protected storage capacity. All fittings and much of the machinery received from the East for installation in new vessels will be housed on arrival and then moved by railroad or water to yards where required. The government has decided to erect a warehouse of its own on property of the commission so as to gain as much storage space on the waterfront as possible.

The Valveless Pump & Foundry Company has completed the installation of its new plant at St. John's. This company was fortunate in leasing a fine site from the Star Sand Company, sufficient water frontage being obtained as well as a large area of land suitable for the plant itself. This company is engaged in fitting out vessels, as well as in the manufacture of marine equipment.

Mr. Theodore E. Ferris, naval architect, and designer of the Ferris type of 3500-ton wooden vessel, spent some time in Portland during the month of October. Mr. Ferris proceeded west from his headquarters on the Atlantic Coast, and travelled to Portland in company with Captain J. F. Blain, who has charge of all steel ship construction for the Emergency Fleet Corporation in the Northwest, as well as being supervisor in the Washington district for wooden shipbuilding. Mr. Ferris met, among others, in Portland, Mr. Lloyd J. Wentworth, district supervisor of District No. 11, and Mr. Fred B. Pape, assistant manager of steel shipbuilding under Captain Blain. Mr. Ferris visited the Vancouver plants of the G. M. Standifer Construction Corporation, exhibiting a keen interest in the big steel yard. He was greatly pleased when informed of the strides made by this company since February first in getting the tract of land in shape for work and which has progressed so rapidly that five 9500-ton carriers are now under way. At the Vancouver wooden shipyard of the G. M. Standifer Construction Corporation, Mr. Ferris went over the Ballin type of composite ship of 4500 tons, six of which are on the ways at this

plant. He was then taken to the plant of the Peninsula Shipbuilding Company, where 4000-ton steamers, known as the Peninsula type, are under construction. Visits were also paid the plants of the Northwest Steel Company and the Columbia River Shipbuilding Corporation. Of the eighteen yards in the Portland district engaged in turning out wooden ships, eleven have their ways occupied with Ferris hulls. No additional contracts for Hough steamers were awarded after the yards floated their first vessels of this design. The Standifer interests having two wooden yards, one at Vancouver and the other on North Portland Harbor, are building different types—Ballin ships at Vancouver and Ferris vessels on North Portland Harbor. The Supple-Ballin plant is engaged in building the Ballin type exclusively and the Kieran & Kern Shipbuilding Company took on four of the Ballin ships. The Foundation Company is wholly occupied in providing the French government with tonnage in the way of steam auxiliary schooners and the Peninsula yard has not attempted any government contracts other than for its distinctive plan.

Of the twenty steam auxiliary schooners that the Foundation Company contracted to build for the French government, seventeen had been floated up to October 15th, and fourteen of them delivered. The matter of new contracts has been held up pending a final decision of the Emergency Fleet Corporation. Mr. Robt. H. Laverie, of New York City, chief surveyor in the United States for the Bureau Veritas and who is directly in charge of the French tonnage building in America working with the French High Commission, was in Portland the early part of October, accompanied by Bailey Hipkins, fourth vice-president of the Foundation Company. Mr. Hipkins and Mr. Laverie left Portland for New York to confer with all concerned in this important matter. The French government is said to be the owner of the yards at Portland and Tacoma, as far as the plant equipment is concerned, and is also the holder of ground leases, the Foundation Company being largely an agent. For this reason it is felt that the Emergency Fleet Corporation, wishing to aid in every way the Republic of the Tricolor in the war against Germany, will not seek to prevent the building of ships at these plants. The original program called for one hundred and twenty vessels to be constructed in the Northwest, the number to be divided between Portland and Tacoma.

It is said from time to time that the government is pruning its wooden shipbuilding program, but this is not borne out by the activity of the larger plants, which are adding to their equipment rather than holding back. The Grant Smith-Porter Ship Company has recently finished a new dock warehouse, an office building, a copper shop and also



S. S. "Caponka," built by the Grant Smith-Porter Company

a wing to the main administration building. Sixty editors of Oregon publications, interested in the building of vessels at Portland, recently paid a visit to the Grant Smith-Porter yard. Publications of the interior of the State of Oregon have done much to advance the welfare of the tidewater plants, yet probably only a comparatively few of the men directing the papers had ever had the opportunity to make a minute inspection of any of the shipbuilding plants. Mr. Eric V. Hauser, general manager of the Grant Smith-Porter yard, therefore arranged for their visit while a convention of publishers was being held in Portland.

Captain J. F. Blain, in charge of the Eighth District of the Emergency Fleet Corporation, has perfected a system for furthering deliveries of materials at the seventeen steel yards in the Northwest district. Production managers of all establishments will meet at his Seattle headquarters each month and work out a more equitable and dependable supply schedule. The erection of the new plant of the Pacific Coast Steel Company at Portland, with its huge shops at Bridgeport, just below the city, will greatly facilitate the delivery of certain steel parts to shipbuilders and others concerned in the Northwest district.

John H. Rosseter, director of the Bureau of Operations of the United States Shipping Board, has lost one of his most valued aids in the Northwest through the fact that Captain Jack Speier, port captain in Oregon, recently departed for Washington in connection with a commission issued him as captain in the Engineer Officers' Reserve Corps. The understanding is that he is to be detailed as a marine superintendent. Captain Speier is a San Franciscan and began his sea career on vessels running out of the Golden Gate, acting as second mate on the old clipper Shenandoah and ultimately finding his way into steam. He was master of the transport Lawton during the Spanish-American war, and in 1903 was chief officer of the dredge Chinook. Later he was made head of the engineers' patrol service on the Columbia River and ten years ago accepted the appointment as harbor-master of the city of Portland. In March he obtained leave to go into the government service

again, taking care of the dispatch of new vessels. Mr. C. D. Kennady, Oregon agent for the American-Hawaiian Steamship Company for ten years, is in charge of the Bureau of Operation's affairs at Portland and speaks highly of the manner in which Captain Speier formerly assisted him.

The Grant Smith-Porter Company delivered the sixteenth completed vessel from its yard on October 12th, at which time congratulatory messages were received from Director General Schwab and Vice-President Piez of the Emergency Fleet Corporation. The "Wasco", the first vessel accepted by the government from this company, was delivered on June 8th, 1918, since when the following vessels have been completed and delivered: Biloxi, June 9; Kasota, June 30; Blandon, July 14; Boilston, July 18; Calusa, July 25; Moritz, July 30; Dumar, August 23; Manada, August 27; Wakan, August 28; Caponka, September 10; Boxley, September 14; Kuwa, September 18; Bancroft, September 28; Holbrook, September 29; Nashotah, October 12.

Because the new 8800-ton freighter "Western Scout" was fitted with a turbine of 3000 horsepower, an increase of 500 horse-power over engines previously installed as standard, the Northwest Steel Company elected to send her to Puget Sound to be speeded over a measured mile course. As a result, she was accepted there by the Emergency Fleet Corporation and delivered to the Pacific Steamship Company. Other vessels will have the larger engines, and, as was done with the previous ships, they are to be accepted at Portland after ordinary endurance trials of six hours, thereby eliminating the necessity of being sent along a measured course.

Arthur M. Sherwood, vice-president of the Coast Shipbuilding Company, has decided that he can direct his efforts against the Hun army more effectively in actual military service than in building ships, as long as the plant is being directed by Harry E. Pennell, president, and Don M. Green, secretary and treasurer. He has departed for Texas to enter a coast artillery officers' training camp. Mr. Sherwood will retain his interest in the corporation and hopes to return to shipbuilding as soon as the Hun is silenced. He has a brother who is an officer at the front in an infantry regiment.

"Make October a real promise to the boys in the trenches" is a request emanating from Manager Heyworth of the Emergency Fleet Corporation, and from Oregon alone eighteen finished vessels will be the response.

Purchase of a locomotive crane with a lifting capacity of twenty-five tons has been authorized by the Port of Portland Commission as part of the equipment of a new coal dock alongside the St. John's drydock. Robert Wakefield has been awarded a contract for the dock, and it is to be ready for bunker stocks before January 1. The storage capacity will be about 5000 tons and the general plan is to load the fuel in lighters and shift it alongside vessels, so they may be bunkered while working cargo.

Requisition has been made on Oregon mills by the Navy for 600,000 feet of vertical grain fir decking, 4½ by 4½ inches, to be used for mine sweepers building on the Atlantic Coast. Recently the

Newport News Shipbuilding Company placed orders for 500,000 feet of the same material for use in steel freighters building at its plant. As Mills are cutting aircraft stock 4½ inches thick, such portions as are not required for the ships of the air are simply cut square for decking, the material being sorted so that the decking stock is of a high standard.

Robert L. Hague, engineering expert on the staff of John H. Rosseter, director of the Bureau of Operations of the Shipping Board, spent a few days at shipyards of the Northwest during the middle of the month, preceding his departure for Washington.

Instructions from the headquarters of the wood division of the Emergency Fleet Corporation do away with camouflaging of wooden steamers in the future. The reason is assumed to be that the wooden carriers will not invade zones where the treacherous subs lie in wait.

Foremen of the three yards operated under the banner of the G. M. Standifer Construction Corporation gathered at a dinner October 10 as guests of the plant surgeons, Drs. J. C. Zamm, Chester C. Moore and R. D. Wiswall, and received numerous pointers as to how accidents could be prevented. There were covers for 100 and prominent officials of Oregon and Washington attended. The men were urged to realize the value of each individual to the country at this time and emphasis was placed on the loss to the ship programme when men were temporarily incapacitated. "You can't build ships in a hospital bed," was a point driven home. By impressing this on the foremen, it is hoped to have the message carried among the men and thus eliminate some of the carelessness that is held to be responsible for personal injuries in many instances.

After having looked over Portland ship construction establishments and conferred with Oregon builders and Emergency Fleet Corporation officials, R. S. Bonsib, safety engineer of the California district, proceeded to Coos Bay the fore part of the month and returned via that route to San Francisco.

Port of Portland Commissioners have fixed a price of \$7500 on the pilot schooner Joseph Pulitzer, and the city of Portland has offered \$5000 for the vessel. She has been utilized by the latter as a fishing schooner on the halibut banks off Yaquina Bay during the past season, and it is desired to retain her in the work of supplying the public market. The Port of Portland, being short one of its tugs on account of the Navy having leased her, is desirous of having the Pulitzer returned for service at the mouth of the Columbia, but is willing to sell her to the municipality with the expectation that a temporary vessel can be secured to serve the pilots.

Arthur M. Mears, general manager of the Columbia Engineering Works, has returned from the East with a contract for a full powered motorship to be built for Christian Christianson of New York. This motorship is to be a duplicate of one owned in Norway named the "Telegraph." She will be 168 feet on the waterline, with a beam of 30.4 feet. Another vessel on the stocks has been sold to Mr. Christianson, and it is intended to fit her with auxiliary power. Within the last two years this yard has delivered ten vessels.

off filled with every confidence and plenty of enthusiasm. Just around a bend in the harbor is located the United States Shipping Board's champion blue bennant winners in the wooden ship-building game—the Grant-Smith-Porter Company—and there were records to break.

The progress of the "Aberdeen" was photographed each morning, noon and night, and these photographs are being framed, captioned, and will be displayed in the offices of the corporation both at the plant and in Seattle, where A. Schubach, president of the Grays Harbor Motorship Corporation, makes his headquarters.

At 9:00 o'clock Saturday night, September 28, the wonder ship was launched, just seventeen and one-half working days from keel laying. Mrs. Mary Roan, an employe of the company, chosen by the ballots of the men who built the vessel, acted as sponsor, and that night was held one of the most enthusiastic demonstrations that ever occurred at the Grays Harbor metropolis. A big, torchlight, street procession was held, with oratory, singing and dancing to round out the jubilation.

On Saturday, October 5, the machinery of the vessel having been installed, she was ready for her trials, but United States Shipping Board inspectors refused to sanction the trials until certain items had been installed or rectified.

Then Leonard Nosworthy and J. Kinghorne, Lloyd's surveyors, found a number of minor details which had to be attended to before their sanction to the vessel was had. Thus was one day added to the time consumed in completing the vessel, or rather one-half day, for the alterations were completed by Saturday noon.

With about 150 guests aboard, including Capt. John F. Blain, district manager for the United States Shipping Board; Capt. W. A. Magee, Blain's chief assistant in charge of the wood ship division; the officials of the building corporation, and a representative of the **Pacific Marine Review**, the "Aberdeen" cut loose from her moorings Sunday morning, October 6, and steamed out to the Pacific Ocean. The trip lasted for a period of eight hours and all tests were met in the most satisfactory manner.

The "Aberdeen" has been christened the "Wonder Ship of the World," and her builders have been showered with congratulatory messages from Charles M. Schwab, E. N. Hurley, Mr. Heyworth and other Shipping Board officials, as well as from shipbuilders throughout the country. One week later the record craft was exhibited at Seattle and Tacoma prior to loading for her first voyage in the service of the U. S. Shipping Board.

A concrete ferry boat was recently launched at Tanjong Rhu. This is to be used by the Federated Malay States railways to ferry freight cars across to Johore. Concrete is being used owing to the present scarcity of steel. The boat is 125 feet long with a beam of 27 feet and molded depth of 8 feet. It has a displacement of 500 tons. At the same place a large seagoing concrete boat of 2,500 tons deadweight is being constructed.

OPPORTUNITIES AWAITING US IN CHINA

The American minister to China, Honorable Paul S. Reinsch, was recently entertained in San Francisco and during an address he delivered at the Commercial Club of this city, the following remarks were made:

"Our American people are greatly interested in China and have all confidence in the Chinese people. Our forefathers opened the routes for broad, lasting and useful relations between America and China. In our own day we of the Pacific Coast, particularly of San Francisco, are especially privileged, through our direct and free marine contact with the Far East, with resulting superior knowledge and experience of the Far East, to be captains and principal emissaries of American commercial enterprises in China, Japan, Siberia and the South Seas. The intimate personal relationships you cultivate at San Francisco through your hospitality to men of the Far East are enabling you in spirit and in act to excel in conduct of American Oriental trade. The great cities of our Eastern States like Chicago, St. Louis, Detroit, Cleveland, Pittsburgh, Philadelphia, Boston, and above all New York, look to San Francisco as intimately understanding the Far East and having Far Eastern commerce well in hand. * * * China is undergoing momentous change. In commercial phase it is changing from doing business on a basis limited to personal acquaintance. The new basis is more impersonal and of the nature of corporation activities now covering vast distances and trafficking in enormous quantities. Similarly, in affairs of government the old order, wherein excellence in civil service examinations inducted men to life careers in public service and brought some of them to highest office, has changed, and in the change temporary defects and difficulties appear which the good judgment and the sound character of the Chinese as a nation will overcome as the nation accustoms itself to the rule of impersonal law through a parliament and courts and elected executives. In business enterprises the Chinese have long managed on quick sales and at profits ranging above 12 per cent and even frequently to 24 per cent, and there is not a little unreadiness on their part to be persuaded of the advantages of more constant flow of profits from larger capital and moderate rate of interest. China is a second France in point of marvelous frugality of her people, with consequent great accumulations of capital; many a little village in China where productions or industries in silk, tea, rice, beans, bamboo, shipping or other occupations have been followed for generations untold, surprises us with the fact that it has several quietly and usefully living millionaires. Foreign support is encouraging application of Chinese capital to the more general and public advantage of China. The foreign trade no longer clings to the treaty ports; it is extending throughout the interior and it is requiring a more accurate, complete and instant knowledge of man and conditions in all parts of the vast territories of China. China is in a constructive era. The ability, energy and character of American commerce builders have now a great and unrivalled opportunity in China.

The New Era of American International Trade and Finance

By John Clausen

Vice-President the Crocker National Bank of San Francisco

THE unprecedented economic changes which have taken place present no more striking phenomena than the rapid strides of our industrial activities, and while no one can foresee with any degree of certainty what the conditions will be after the war, it would seem timely for the study and solution of difficulties which impede the free flow of oversea trade and impair the more rapid building up of a permanent and profitable commerce when normal times again prevail.

We must face conditions as they now appear and recognize that of vital concern are the broader international problems of industrial competition and efficiency. The day of barter is long past; no longer is it a question of trading commodity for commodity or so buying in a reasonably open competitive market the products of industry. In the present time and age it is a matter of trading through other mediums of exchange, and while recognizing an equal desire on the part of the producer to sell his goods and that of the financier to facilitate the operation, it frequently happens that, when considering the strict economic principle as applied to commercial undertakings, the power of sober reasoning is not plainly apparent and fully manifested.

The measure of success to which we are entitled will largely depend upon our ability to meet in organized and scientific strength the competition of other nations. If, therefore, we are to become the financial center of the world, and gain assured supremacy in international trade, we must make adequate preparation for retaining these national advantages as well as for assuming all the responsibilities and obligations which are attendant upon them.

Our banking element must be determined to modernize their methods thoroughly and in good time, as lack of interest or procrastination in this direction may seriously check the work of trade expansion, upon which so much depends. There are many reasons why the country banker particularly should enter a broader field of operation, for time alone will show with what vigorous efforts the larger banks throughout the United States will enter into competition with them by means of the added facilities afforded under the new banking law. The consequent absence of restraint in rivalry for business as between the larger and the smaller institutions may no longer figure as a barrier to the enterprising city banks, who in their keen pursuit for developing new activities may less likely respect the old understandings of restricted territorial rights.

While, of course, this feature of the situation mainly affects home conditions, it must not be forgotten that there are likewise to be considered the problems which confront us in our foreign banking relations.

Advancement of International Trade Through American Banks in Foreign Countries

Our traditional methods in this direction particularly must be earnestly taken under advisement by our forward-looking men of affairs, as the lack

of interest to further the scope of our system of branch banking in foreign countries may seriously check the work of trade expansion and place our merchants at a disadvantage in later meeting aggressive European trade competition.

It is generally opined that in order to enable the wheels of commerce to run smoothly and rapidly, our foreign relations cannot successfully be developed so long as it is necessary to operate through banking institutions of competing nations.

The Federal Reserve Act provides for the establishment of branches by member banks in foreign countries; and on the assumption that it would better serve their interests, the law of December 23, 1913, was subsequently amended to provide that members of the system may co-operate for the purpose of jointly owning and operating foreign dependencies.

Co-operative combinations, such as may be deemed expedient to develop our foreign trade relations in normal times, are now generally agreed to be essential and a recognition of this principle in the development of oversea commerce is, in my opinion, most necessary to our economic progress.

If the United States succeeds in establishing a system of branch banking thoroughly suited to modern world-wide conditions, a great forward step will have been taken in consolidating the advancement already achieved through the financial and industrial energies of our population.

Bank and Commercial Acceptances a Factor in Financing Our Trade

No measure has been of greater importance—as affecting not merely the local financial conditions in the United States, but the entire situation from an international standpoint—than the Federal Reserve Act. Its facilities for branch-banking in foreign countries especially, and the privilege granted for bank and commercial acceptances, accord a great improvement of system in our relation to commerce, likely to give the United States greater power in foreign trade.

One of the difficulties of intelligently following the various provisions of the new law unquestionably lies in the imperfect comprehension which exists—even in bank circles—with regard to what the act is intended to supersede and improve. The banking element of our country should deal with these problems as seriously as is deserving and seek what help may be given to make the purpose of the law concrete facts by the scientific employment of capital and credit in the shape of organized facilities, which in turn will react to the benefit of the public from the operation of a well-regulated and uniform banking system.

The Federal Reserve Act, which became operative by the opening on November 16th, 1914, of the Federal Reserve Banks, is essentially intended to bring into existence a commercial banking system that will assist in more advantageously financ-

ing our internal and external trade, and every indication points towards its becoming a powerful force behind the business machinery of our country. A financial development of the United States that will meet the growing demand for commercial expansion is but a matter of national enterprise and largely rests with its people in their campaign of education to conform with new conditions and adequately cope with and keep within legitimate bounds the activities of trade.

To business men and bankers it is a fact generally acknowledged that one of our most urgent needs is a self-liquidating system of trade operations, facilitated by means of a properly recorded and readily negotiable credit instrument.

It is the lack of credit facilities, more than anything else, that hampers business, and the difficulties in my mind with merchants do not to such a large extent exist for an increase of capital to enlarge their output, but rather as a result of their not being afforded the advantages accruing from a modern system of financing their sales, and it is in this direction mainly that the new Federal Reserve Act will prove of immeasurable value in demonstrating the ability of our merchants and bankers to adequately and efficiently meet and advance the needs of commerce.

In the light of the new order of things, the matter of arranging our business to harmoniously accord with the acceptance feature should serve to impress the industrial element with the timely discontinuance of a system of finance that has long become obsolete in other large nations of the world.

The superiority of the Trade Acceptance over the Open Book account for the purchase or sale of goods—its power to broaden the buying field for the merchant and enable the seller to handle his business at a smaller operation cost—is becoming more and more apparent to all interests alike. Whether that feature with us in business and banking will show a development of as huge dimensions as it has in Europe or take a secondary position, remains a matter of conjecture. The main point, however, for the people of a great nation is to keep in mind that the demand for modernized credit facilities is becoming universal and increasingly urgent, with the rightful expectation that it will place the economic position of this country on a firm and secure basis.

As evidence of the attitude of leaders in the field of sound credits, it is gratifying to make mention of a resolution made at a recent convention of the National Association of Credit Men, who "clearly and emphatically" placed themselves on record as favoring the steady and rapid substitution of trade acceptances for the open account method. Added recommendation was given that the association be committed to put forth earnest efforts in prevailing upon each member to do his part in lending assistance towards the creation of this class of paper, fully well realizing its practical conformity as a discountable credit instrument, which will place commercial obligations in a form definite as to date of payment, not subject to deduction and unquestionably negotiable.

The secret is here given in one word—"Negotiability." It is that which to the merchant explains the success of financing a business on the soundest principles, instead of the antiquated, disadvantageous and non-negotiable open book account, and to

the banker lends a feeling of confidence and security in his operations with the commercial element.

In the technique of the law, the trade acceptance has precedence over the open book account, in that the signor of such an instrument agrees to all the terms of purchase as having been complied with, while in the latter case the individual charge entry must be proven and may leave open points for contention.

The financial market would welcome active trading in acceptances, as little choice is now offered to deal in other than "commercial paper", which in its true light does not pass the bounds of "accommodation or finance bills", without relation to specific trade operations or methods of systematic checking.

Development of Trade and Bank Acceptances.

History records the use of trade and bankers' bills as having first been brought into commercial operation by the Florentines in the twelfth century, and gradually finding its way into France, when by the end of the year 1400 that class of paper is reported to have been in general use throughout commercial Europe. From all accounts the earlier bills were made payable to bearer or his assigns, and the first known mention of an endorsement upon these instruments occurs in the Neopolitan Pragmatica in 1607. While this medium of commercial usage seems primarily to have been confined for trade with foreign countries, it was later extended to embrace domestic operations as well.

In reflecting upon conditions in our own country as existing prior to the Civil War, we discover that a considerable proportion of commercial transactions were then effected by bills drawn at various usances; as a matter of fact, six months' sight drafts were not of uncommon practice. At that time this form of negotiable paper commanded a high standing and operations flourished under its application until the period following the war, when the question of credits became uncertain, and in order to encourage the payment of cash for commercial transactions, the mercantile discount system came into being.

This custom—largely through the force of competition—grew into the now so well known open book account, which up to but a few years ago was virtually the only financial record of mercantile transactions between buyer and seller. Competition in trade which first created the mercantile discount system and later devolving into the open book account, has again in the new order of things encouraged the use of the acceptance as a bankable and approved form of modern credit system.

With the new era it is safe to predict that before long very little money, if any, will be loaned by bankers in this country to merchants or manufacturers who cannot produce other evidence of receivable assets than open book accounts.

There are doubtless many difficulties to overcome in rearranging trade operations to accord with present-day financial requirements. Every business man who understands these problems and appreciates the urgent need of a reform in our commercial inter-relations, cannot fail to recognize his obligation and render the valuable assistance necessary to bring about an evolution in commerce of the greatest importance to our country.

It is for the thoughtful merchant and banker to consider and use every means in his power to have the machinery of acceptances perfected to a degree that will enable the promotion and maintenance here of the highest financial credit. By their concerted co-operation for the accomplishment of this result, the United States will ultimately be given a mighty impetus in commercialism.

Export Combinations an Aid to Foreign Trade

The real object towards which we, in common with other nations, should aim, is to make ourselves more efficient, and, with increasing knowledge and skill, train all classes of intelligent labor.

Our commercial and financial organizations have grown up without much system, and it is time that we depart from the old practice in adopting real activities along new and improved lines. Everything that will add to the ability of this country to hold its rightful position in foreign trade should be encouraged and developed to the utmost of human endeavor.

A study of the commercial organizations in European countries suggests the desirability of manufacturers and producers here enjoying the right of participating in possible export combinations. Co-operative associations, organized to increase the scope of American export business, would as well facilitate a helpful and necessary growth of our home industries. Such influences have very largely moulded economic developments of other nations.

The costly, and in many instances inefficient, employment of too many agents has in a large measure proven responsible for the retarding of successful competition in foreign markets with our more alert competitors.

The more successful countries—and in this may be included the individual—are those at pains to apply scientific study and knowledge to the problems with which they are the most intimately associated.

Preparation for Commercial Education

While individual opportunities are even now presented to our enterprising business men, the general prosperity of foreign trade expansion can only be guaranteed by a ready co-ordination in all elements of our national and commercial strength.

There is no more important issue than that which aims to

make scientific study directly applicable to practical life, and to this it would seem that our first thought should be directed.

To meet the constant demand of the commercial world for available young men who in a competent manner are qualified to occupy positions of trust and responsibility, too little importance is given to the necessity of finding a common ground on which the business men and the educator can meet and solve the problems with which we are confronted.

There can be no serious dispute amongst men who are capable of being taught by experience that our existing educational system along commercial lines is defective, and that reforms in many directions are urgently needed. Every encouragement should consequently be afforded the matter of providing for the establishment of proper schools to pursue regular studies of commercial, intellectual and cultural relations between the various peoples of the world, keeping pace with the corresponding developments along those lines.

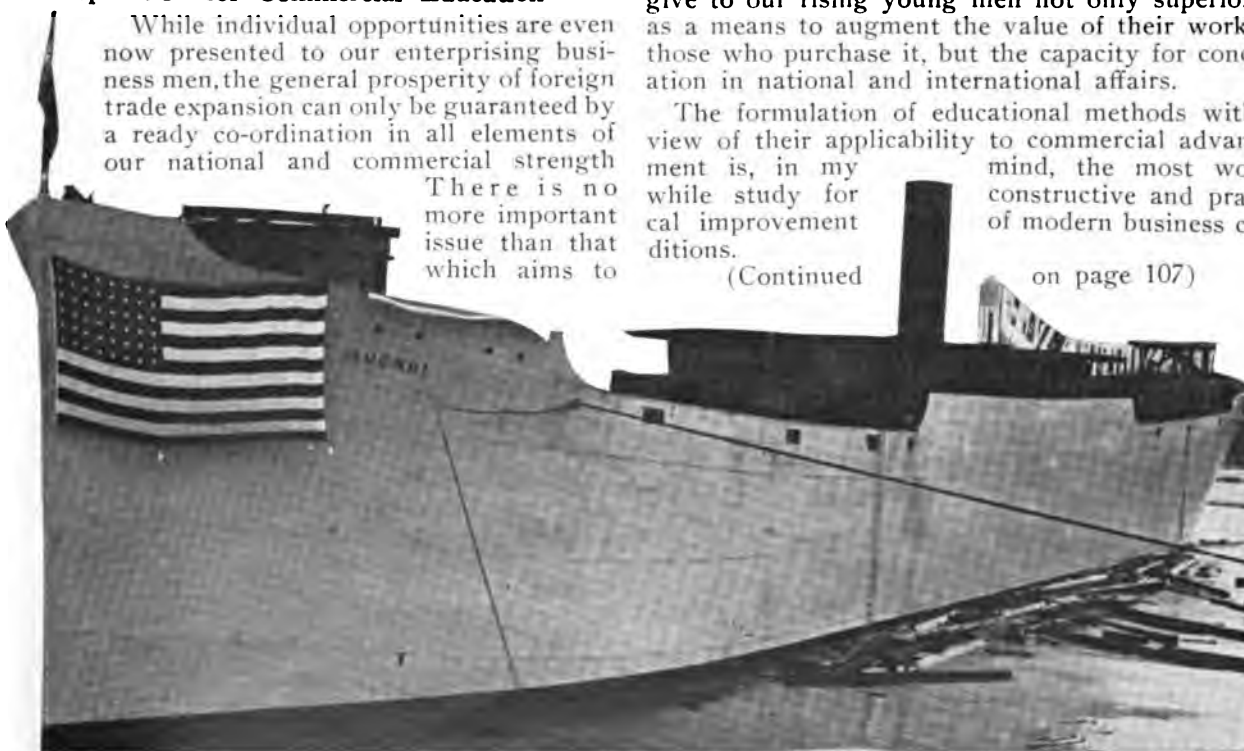
If we accept the assertion of the Sage Foundation, that only five percentum of the males in the United States are prepared by definite training for their occupations in life, it is readily conceived that our present courses of early studies are wholly inadequate to meet the needs of our young element, who in such a large percentage plan for a commercial career. It would seem, therefore, that the first forward step to devise effective courses of study and develop methods of commercial attainments would be to unite the educational agencies in promoting the move to specialize in instructions towards the most direct preparatory training.

The interest shown by our younger element in any subject pertinent to foreign trade forcefully reveals the necessity of educational preparation, in the teaching of commercial languages of the world and the fundamentals of business instruction. Such training would have far reaching consequences and give to our rising young men not only superiority as a means to augment the value of their work to those who purchase it, but the capacity for conciliation in national and international affairs.

The formulation of educational methods with a view of their applicability to commercial advancement is, in my mind, the most worth constructive and practical of modern business conditions.

(Continued

on page 107)



The "West Avenal," an 8800-ton freighter launched by the Schaw-Batcher Company, South San Francisco, on October 13. This company launches its vessels sidewise. The "West Avenal" is the largest vessel yet constructed by the Schaw-Batcher plant



Panoramic view of the works. Reading from left to right: Pattern-Storage Building, Foundry, Forge Shop, Machine Shop No. 2, Machine Shop No. 1. The Power House is in the rear of the Forge Shop and the Erecting Shop is built at the extreme right end of both machine shops at an angle of 45 degrees

A Record-Breaking Erecting Feat

FROM the moment this country declared war upon Germany and the tremendous shipbuilding program was decided upon, the demand for — additional productive facilities in the Westinghouse plant became more imperative than ever before. The Westinghouse Electric and Manufacturing Company now have under contract for the Emergency Fleet Corporation the construction of marine power apparatus for the equipment of some three hundred and fifty vessels. The marine business of this company has grown to such dimensions that an expansion of its manufacturing facilities was absolutely imperative, and as the district in East Pittsburgh, Pa., where its operations have been going on for so many years, was already too congested to allow any further extension, the necessity to look elsewhere naturally suggested itself.

A factory site was finally determined on and Essington, Pa., on the lower Delaware River, was selected on account of the peculiar advantages of its location for an industrial enterprise of this nature. The acquisition of a property of 500 acres having become a fact in the latter part of 1916, the company lost no time in the preparation of the plans for the establishment of the plant; but in view of the lack of raw material, the almost paralyzed condition of transportation, and the great demand for labor, many difficulties were encountered in this direction. That the company, in spite of these adverse conditions, overcame all of these obstacles sufficiently to break ground about April 1st of the following year, was therefore considered quite an achievement in itself, especially when the magnitude of the contemplated undertaking is taken into account.

The original plans, whose realization had been made impossible while war conditions prevailed, called for a combination of factory buildings four times as large as the plant, which has been erected. An adequate idea of these proposed plans may be formed when it is understood that the works already built include seven structures with a combined floor space of approximately thirty-five acres. These buildings are the pattern-storage, the foundry, the forge shop, the power house, two machine shops and an erecting shop. The works are now employing a force approaching 4000 operatives, and the schedule of production in the shops calls for the construction of one complete vessel equipment of power machinery per day.

Building operations were begun on April 1, 1917, with the pattern shop and storage house, which is one structure and which was finished on August 15. It has a floor space of five acres. The erection and completion of the other buildings was carried on with equal rapidity, and while construction was going on the delivery for the equipment of the various buildings was also pushed with the utmost speed. To form an idea of what was accomplished in this direction, it might be mentioned that on the 20th of November, when the last of the seven structures was completed, the foundry was started into operation. Some of the other departments, like the pattern shop, had begun operations even before that date. Besides the pattern storage building and the foundry already mentioned, the plant includes a forge and blacksmith shop, two machine shops, each of which is a building 125 x 750 feet; a power house and an erecting shop. The machine shops have two stories and each story operates two bays. All buildings are constructed absolutely of fire-proof material, consisting of re-inforced concrete with terra cotta tile, steel frame, tile wall and steel window sashes. All the roofs are of concrete.

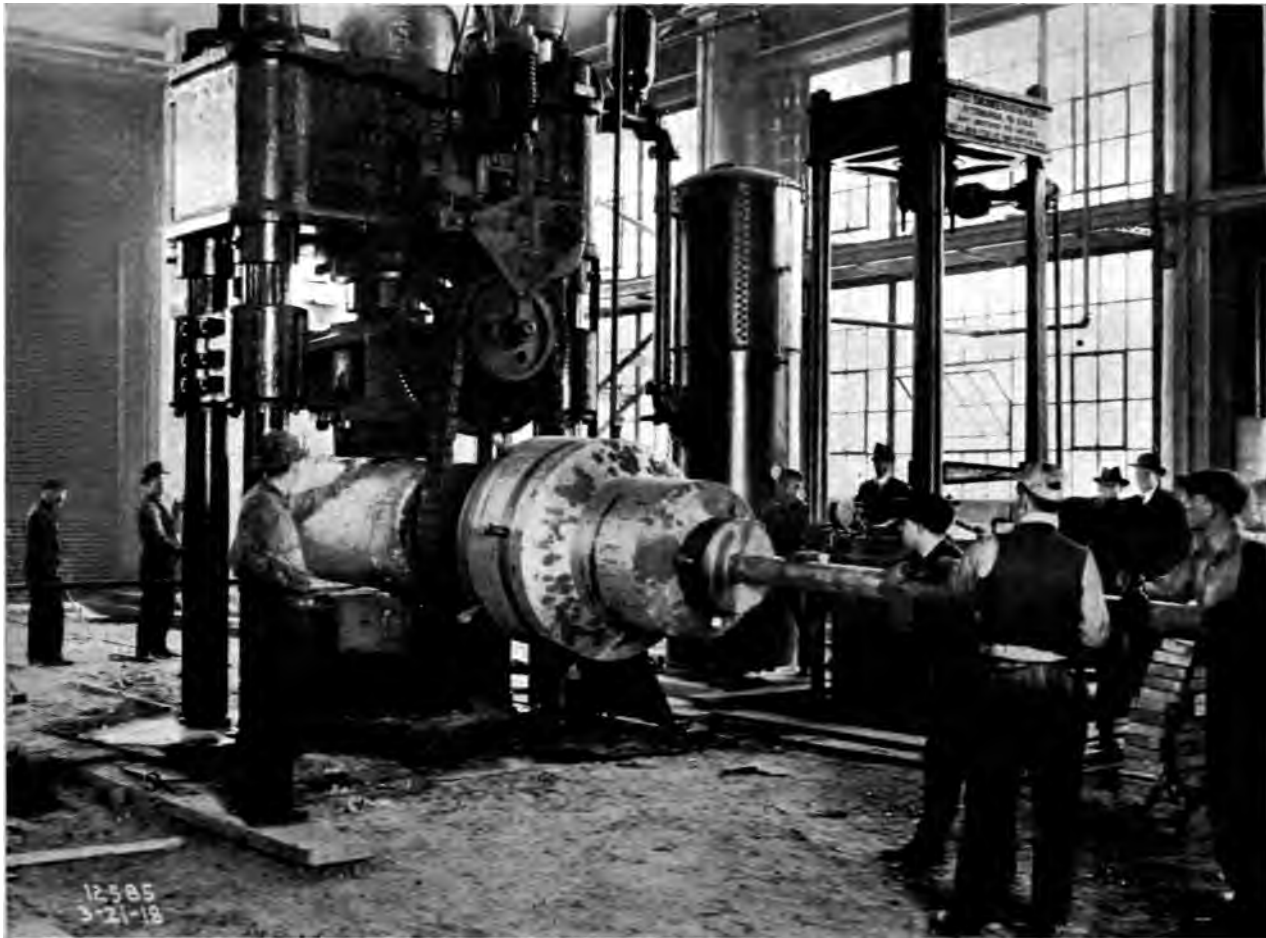
In the erection of every building, the greatest attention was given to the comforts, conveniences and requirements of the operatives. The latest and most approved developments are installed in every building. Provisions for hygiene, sanitation and ventilation are found throughout the factory. Sanitary drinking fountains are distributed everywhere. There is a mezzanine floor in the foundry equipped with individual clothes lockers, washrooms, as well as shower baths with hot and cold water.

For the accommodation of the employees, the works also maintain a relief department, which includes a hospital with medical attendance.

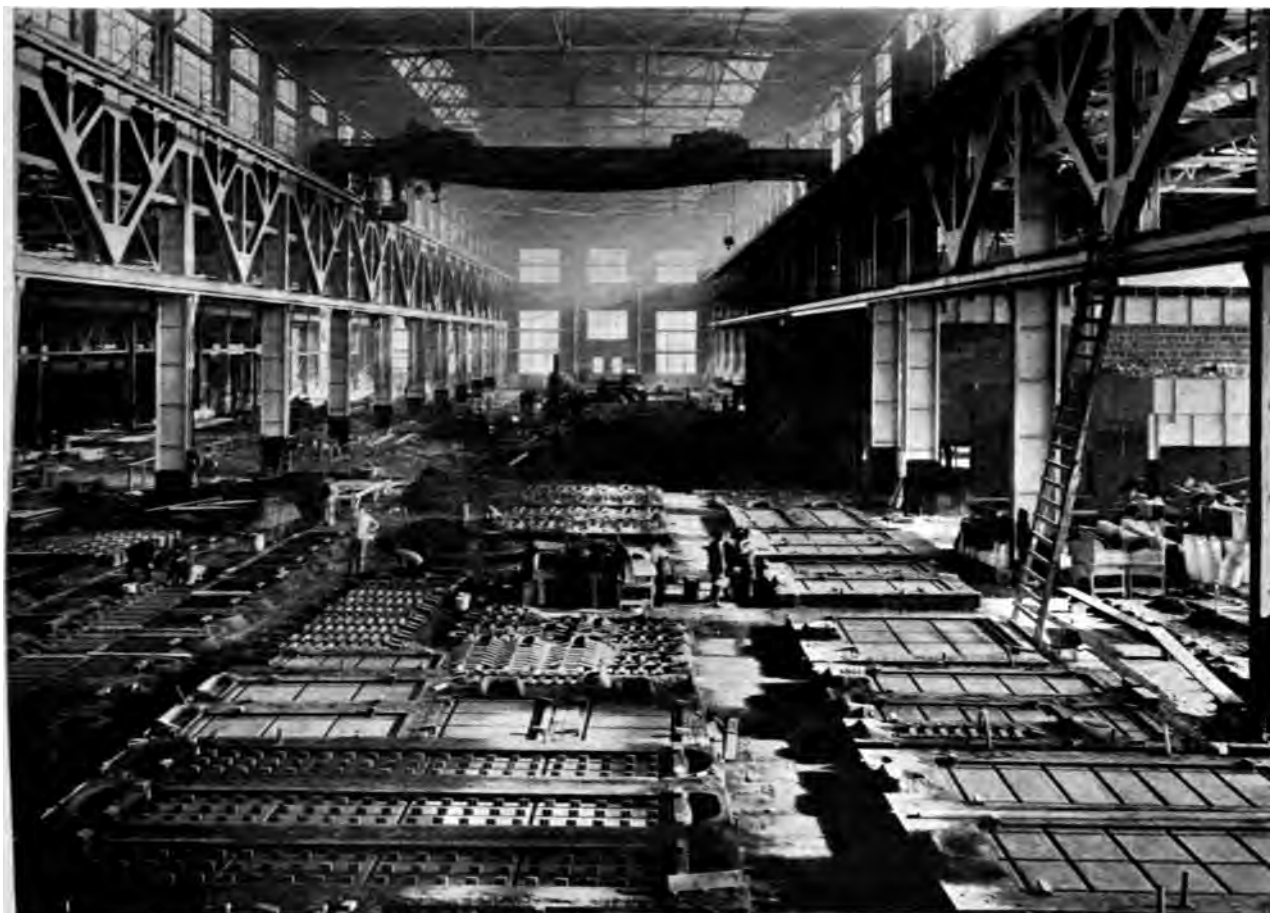
The company has established a welfare department, which has charge of a dining room for the general office employees and two cafeterias, which are located in certain parts of the works, to meet the convenience of the force. This department also provides the employees with social entertainments, maintains a band and arranges for social gatherings.

The entire plant has a triple sewage system, a sanitary sewage, a storm sewage and a refuse disposal plant.

The development covers an area of 500 acres, situated between the Delaware river on the south and Darby creek to the north. Of this ground 110



The 1000-ton hydraulic press in the Forge Shop



A scene in the Foundry

acres have been set apart for the factory site, while the rest will be used for the erection of dwellings for the employes of the works.

The transportation and hauling system connected with the plant is very complete. The shops are so located that the tracks of the Pennsylvania Railroad system traverse it for its entire length on the south and the tracks of the Philadelphia and Reading Railroad operate in the same manner on the north. From these main lines several switching tracks run direct into the factory at various convenient places. All the buildings are connected by standard gauge railroad tracks—in fact, the aggregate mileage of tracks covering the factory yard amounts to forty-one miles. These interworks tracks are operated by steam and electric locomotives as well as electric trucks. The latter are used for the transportation of material from one department to another—for instance, all finished castings or forgings are moved with the least loss of time from the foundry and forge into the machine shops, where they are laid down alongside of the machine which is to tool them. When the product has gone through the machinery process, it is hauled by the same electric trucks or steam locomotives into the erecting shop, where the apparatus is assembled, tested, and from which it is also shipped.

In the equipment of this factory, only the latest design, type and models of modern machinery have been installed—in fact, the operation of the plant represents the most up-to-date methods in that respect. Inasmuch as in the construction of steam turbines, reduction gears and marine apparatus the highest class of skilled workmanship is very essential for the realization of the efficiency, accuracy and reliability, so important in marine work, the equipment of the shops has received the most careful consideration. All lathes, planers, milling machines, drill presses, horizontal or vertical tools, etc., are of the latest type, and many of them have been especially designed by the company's own engineering department to meet the requirements of the work they have to perform. For example, the turning of turbine and propeller shafting is done by "single purpose lathes," designed by the company for this particular work. The cutting of the gears and pinions, which, as everyone knows, demands the most minute accuracy, is also performed by machines of especial design and highest class workmanship.

Speaking of the machine tool equipment and its operation in general, every tool is operated as a self-contained apparatus by its individual electric motor. There is no line shafting or belting in any part of the shops. The electric current for these tool operating motors is supplied by the company's own power plant. Each tool has a variable push button switch for regulating the speed, or for starting and stopping the machine altogether. For the prevention of any accident from men coming in contact with any of the revolving parts of the machinery, these revolving parts are covered by a sheet steel netting of an eighth to a quarter of an inch mesh. This netting can be quickly removed to give access to any part of the machine when necessary.

An interesting feature of the pattern shop is its location on the fourth floor of the pattern shop building, which was decided upon because it gives the greatest amount of light from sky lights and windows on three walls of the entire shop. The equipment of this shop includes a complete assort-

ment of modern woodworking machinery. All of these machines are also operated electrically and protected in the same manner as the tools in the machine shops.

In the forge and blacksmith shop, hammers of different sizes are operated, besides a 1000-ton hydraulic press, which forges the steel shaftings for turbines, reduction gears and propellers.

The foundry has at present a capacity of 250 tons of gray iron per day, which is produced from the melts of three cupolas and three hot-air furnaces. Two of the cupolas have a diameter of 66 inches and one 60 inches. Two of them are equipped with charging machines. Two of the air furnaces have a capacity of forty tons and the third fifteen tons. These air furnaces, which burn bituminous coal, were installed here, because large, unbroken pieces of scrap may be charged into them and the entire heat is available at one time. This latter advantage is particularly important when it is necessary to provide iron for an unusually large casting. There are separate sections in this foundry for the production of large and lighter castings. Pneumatic rammers are in general use. Eleven ovens for drying the molds are installed of various sizes.

In order to conserve floor space, molding sand is supplied to the foundry in a novel manner. In the sand-mixing department it is dumped into steel boxes, which are loaded on storage battery trucks and taken through tunnels into the foundry. The sand boxes are then lifted through hatchways in the foundry floor by means of a crane. The sand department is located in the basement of the pattern-storage building, which is immediately adjacent to the foundry. Here are bins which have capacity for storing 120 carloads of sand where it will not be exposed to the weather.

Speaking of cranes, that feature for handling material has not been lost sight of in any of the shops—as, for example, in the foundry alone there are installed eleven cranes ranging in capacity from a three-ton jib to a 100-ton crane, all electrically operated.

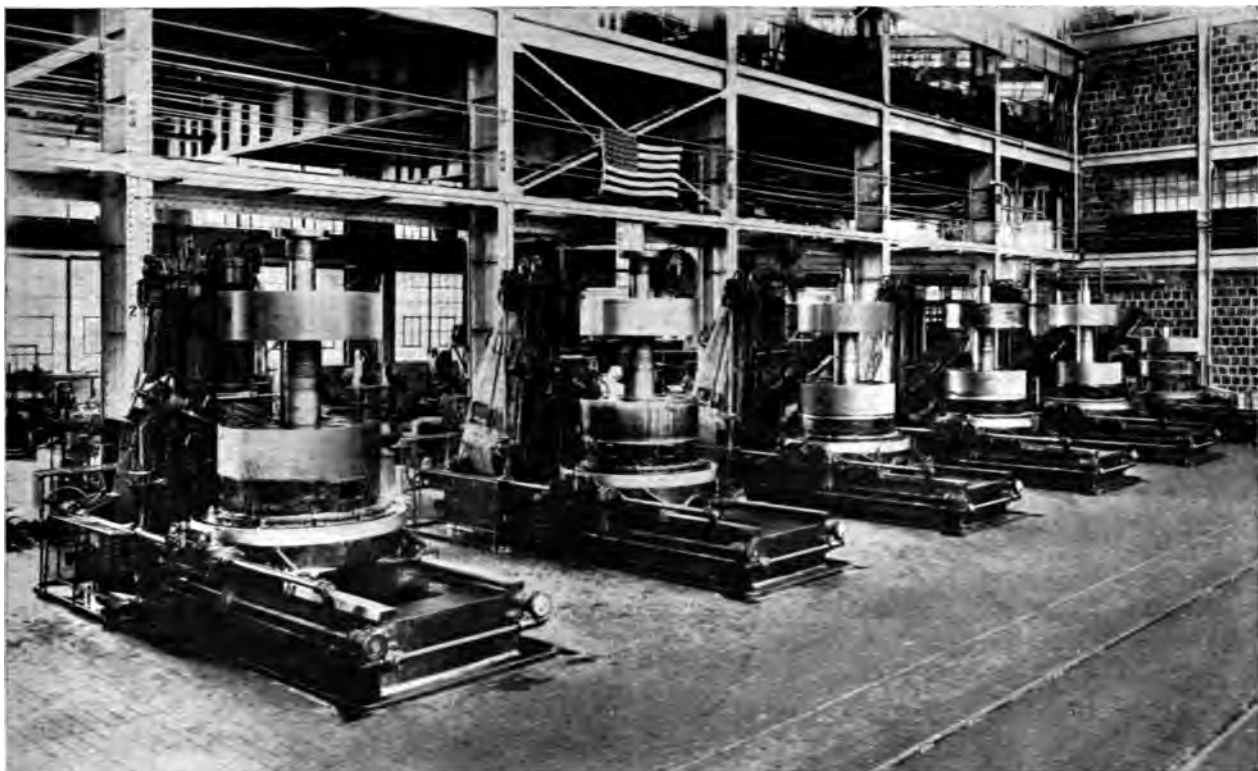
Considering that the ground, where this plant is now operating almost at its full capacity, which represents a complete vessel equipment per day, was a barren waste less than eighteen months ago, it is not difficult to understand that the company aimed for the earliest possible production from the very moment the first cornerstone was laid. This object was realized on November 20th, 1917, when the first heat was poured in the foundry. The first shipment was made from the plant on January 19 of this year, consisting of seventeen tons of castings sent to East Pittsburg. The first shipment from the machine shops—that is to say, finished product—was made on February 14 of this year and it consisted of one propeller shaft template and one taper gauge, which was sent by express to H. G. Trout & Company of Buffalo, N. Y. The first shipment of material to go out of the works direct to the shipbuilders was made on March 19. It consisted of three propeller shafts, weighing 27,900 pounds, representing one shaft each for the first three ships built by the Submarine Boat Corporation of Newark, N. J. Since then production has increased at a remarkable rate until today these works have shipped apparatus to the Submarine Boat Corporation representing the equivalent of sixteen complete vessel equipments, two complete equipments have been supplied to the Merchants



A battery of lathes in Machine Shop No. 1 turning Propeller Shafts

Shipbuilding Corporation at Harriman, Pa., and the equipment for two U. S. destroyers has been supplied to one of the government navy yards. In addition there have been shipped parts of equipments for fifty different installations. Indeed, the output is increasing from day to day as one after another the difficulties are overcome, which are

usually met with in the establishment of a new plant. In this case the company was fortunate, in so far as it was able to transfer from its East Pittsburgh shops a number of old and experienced men in the business. These men formed the nucleus for the new organization, which in efficiency promises to rival the parent plant at an early date.



A battery of six Gear Cutting Machines. These machines are of the company's own design and construction made especially for this class of work

Los Angeles Reaching Out for Foreign Trade

THERE is now under construction in Los Angeles over one hundred million dollars worth of ships. As in many of the other Coast cities, almost a miracle has been accomplished in shipbuilding and incidentally the great possibilities for industrial development have been proven.

Although we cannot estimate as to the exact time when peace will be declared and our merchant marine freed for use in developing our foreign trade, at the same time all keen thinkers are making preparations for this epoch-making period and laying plans for their share in assisting to maintain our country's greatness on the seven seas.

Mr. Clarence H. Matson, traffic manager of the harbor department of the city of Los Angeles, in his report to the Board of Harbor Commissioners, gives some very interesting information regarding Los Angeles harbor and which should prove an inspiration to our different American exporters, importers, shipowners and commercial bodies throughout the country who are going to play such an important part after the war in the long-sought-for rehabilitation of our American merchant marine and its important place in the markets of the world. Excerpts from Mr. Matson's report follow:

One can scarcely comprehend the magnitude of the opportunity offered Los Angeles—to the entire Pacific Coast, in fact—by the building of the great merchant fleet which the United States has under construction. We are informed that this fleet will aggregate 25,000,000 tons by 1921—more than all the merchant vessels sailing under the British flag before the war—and Great Britain at that time possessed two-fifths of all the world's tonnage. This would be equivalent to fifty of the greatest steamship companies of all the globe combined into one.

America's job after the war will be to keep these ships busy—to develop commerce enough to fill them. There will no longer be a shortage of ships, but we will have all the ships we need to carry our commerce to market.

Just across the Pacific Ocean from us live the populations that will afford the world's great future markets. Down along the west coast of Mexico, Central America and South America, are tremendous trade possibilities awaiting development. Our commerce with some of these countries has shown a great growth in recent years, but it has only well begun. The next two decades should bring a development along this line unprecedented in the history of the world.

One of the great articles of commerce of the future will be cocoanut and its products, copra and cocoanut oil. A tremendous tonnage of these products will be moving into the United States within a few years.

Two years ago, when I last visited Seattle, soya bean oil was just beginning to move in large quantities from Manchuria, and agitation had started to build tanks so that it could be handled in bulk. This has since been done, and soya bean oil now forms one of the largest items of Seattle's commerce. Last year the movement amounted to 107,217 tons—one-third of Seattle's total imports from the Orient—and valued at more than thirty million dollars.

As Seattle is the logical port for the importation of soya bean oil, so Los Angeles is the logical port for the importation of copra and cocoanut oil.

Rubber and tin are now two large items of import into the United States. They come principally from the East Indies and Straits Settlements with lesser quantities of tin from Bolivia, and rubber from elsewhere in the tropics. These products should move principally through this port.

Raw sugar is another item of great possibilities for importation, with the refined product for exportation. There are seven large beet sugar refineries in the territory immediately adjacent to this port. These refineries, involving a large amount of capital, operate only about four months in the year, manufacturing sugar from beets. The balance of the year they are idle, tying up millions of dollars invested in them. It is also necessary to keep an expensive organization together in the eight months' off season. These factories could be made to refine raw cane sugar, as well as the beet product, by the installation of another system of filtration and the necessary handling machinery.

Just across the Pacific in the East Indies and the Philippine Islands are enormous quantities of raw sugar awaiting refining—this in addition to the Hawaiian crop, which now goes to San Francisco and the Atlantic Coast. With plenty of ships available, the trans-Pacific sugar can easily be brought here for refining, and the Southern California factories can be kept in operation practically the entire year.

Grain from Australia, hides and skins from various Oriental countries, nitrates from Chile, many mineral products from Bolivia and other South American countries, cocoa from Ecuador, tagua nuts for buttons from Colombia and Ecuador, wool from Australia, drugs of all descriptions from Bolivia, besides the vast array of lesser articles from the Orient which America uses in great quantities, give promise of imports that would make Los Angeles and its environs a hive of industry; and all of these products come from countries in which Los Angeles should have a trade advantage by reason of its geographical location.

As for exports, the possibilities are as varied as the products of this entire country. Machinery in all its varied forms is much in demand in practically all the markets named in the foregoing paragraphs. Refined oils, which will be supplied in large quantities by the great refineries of this community, and fuel oil for steam purposes, already are exported in immense volume through this port. Food products of various kinds, including fresh, dried and canned fruits, canned fish, groceries and similar commodities which Southern California produces, are in demand in many trans-Pacific and Latin American countries. Cotton should move in large volume through this port instead of going north to Seattle, as it has been doing for several years. Texas and Oklahoma produce one-third of the great American cotton crop. Los Angeles is by far the nearest Pacific port to these States. Within a few years Southern California itself will produce a large amount of the finest cotton. There is a vast market for cotton in some countries of

the Orient. Chemicals, many of which are found in large quantities in the desert regions of Southern California, and the development of which is now under way, are greatly in demand. Some of the largest mineral deposits of the country, particularly of copper, are in the Southwest, tributary to this port.

Particular mention should be made of the undeveloped iron resources of this region. It is a well-known fact that extensive deposits of iron ore exist in the mountains of Riverside county. There are others along the coast of lower California, easily accessible from tidewater. These have not been developed heretofore because of a lack of a proper fuel for smelting which could be obtained cheaply enough to make the process economical. The newly developed coal mines of Alaska will, it is believed, furnish the necessary cheap fuel as ships enough are available to bring it here.

With steel manufactured here, the industrial possibilities of Los Angeles will be rendered practically illimitable. What can be achieved along industrial lines already has been exemplified by what has been done in shipbuilding. Last winter, when Eastern shipbuilding was almost at a standstill for several months because of extreme cold, it was going forward at full blast in Los Angeles. When the extreme heat of August made it almost impossible for men to work in some Eastern yards, work was progressing normally in Los Angeles. Labor is always plentiful here, because laboring men wish to live in California if they can find employment here.

To return once more to the subject of what Los Angeles must do to get ships and build up the commerce of this port:

The fact should be kept constantly in mind that the war has brought about changed conditions. America has become the dominant factor in world affairs, not alone in war diplomacy, but in commerce and other lines of influence. And it is our duty, as well as our privilege and opportunity, to have a great part in handling and increasing this commerce in the future.

Two important steps in the way of organization should be taken at once: First, the formation of an organization to operate ships; and, second, the formation of one or more shipping firms to go after the trade.

The destiny of Los Angeles lies in reaching out beyond the seas. It must extend its lines of influence to Melbourne and Sydney, to Madras and Calcutta, to Singapore and Batavia, to Manila and Hong Kong and Canton, to Shanghai and Hankow, to Kobe and Yokohama and Vladivostok, and down the west coast to Mazatlan and Manzanilla, to the ports of Central America and Panama, to Callao and Antofagasta and Valparaiso, as well as through the Panama Canal to many other countries.

And commerce is something more than a dollars-and-cents proposition, just as it requires more than a mass of people to make a city. A city worthy of the name has a character, an individuality, an influence, and a city's commerce enhances this influence as well as adding to its wealth and prosperity. It is within the province of Los Angeles to stretch forth its lines of influence and bind the countries of Latin America and the Antipodes and the trans-Pacific lands to the new America of the future, by the bonds of commerce and a common interest.

A feature of the commerce of this port has been

the great increase in the tonnage of exports. Only a few years ago the exports were comparatively small. In 1914, for instance, the imports amounted to 1,371,741 tons, while the exports were only 311,053 tons—less than one-fourth the imports. At that time a very large business was coming through the Panama Canal to Los Angeles—a business which has been entirely cut off by the war, so far as water commerce is concerned, as it is now moving by transcontinental railroad instead of by ship. Yet, in the year just closed, the imports were 1,109,100 tons and the exports were 1,127,434—the exports exceeding the imports.

This change has been brought about partly by the development of Los Angeles as an oil export port in spite of the war, and partly by the development of general business aside from that going to the Atlantic seaboard.

The revenues of the harbor department for the fiscal year aggregated \$253,334.97, compared with \$118,323.45 the previous year. This was a gain of \$135,011.52, or 114 per cent. On the other hand, the operating and maintenance expenses for the year just closed amounted to \$164,750.01, an increase of \$106,171.81 over the previous year.

The dry dock project has made considerable progress during the year, and at this date the matter is in the hands of the Shipping Board authorities at Washington for a decision as to the site for the location of the dry dock, part of the cost of which is to be advanced by the Government. This will not necessarily interfere with the installation of other repair shops, should private interests wish to build them.

The project was much advanced by the recent visit to the port of Mr. J. H. Rosseter, director of operations of the Shipping Board. The federal authorities realize the great need for a dry dock here to care for repairs which will be required by the Government's great merchant fleet now under construction.

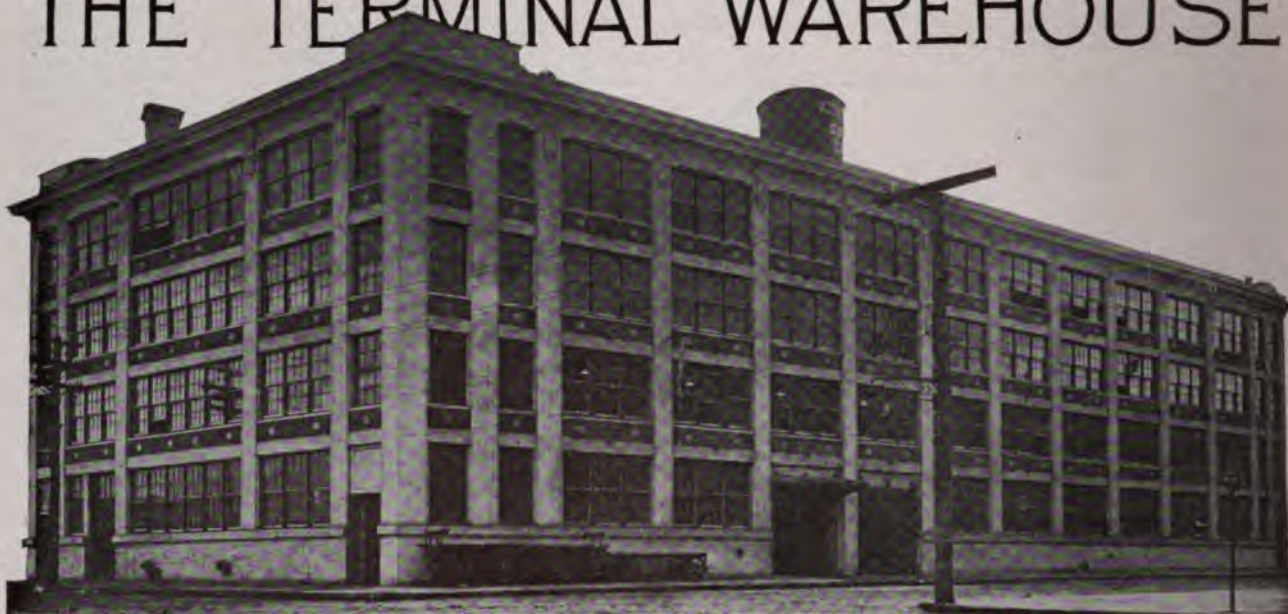
Mr. Rosseter emphasized the necessity of constructing adequate repair facilities as soon as possible. He received the propositions of the various local shipyards as to sites and specifications, and is making a report to Washington on the subject.

The French-American Shipbuilding Corporation, whose general manager is Mr. William E. Russell, has recently incorporated at Los Angeles for the purpose of building concrete ships. Their offices are located at 418-420 Marsh-Strong Building, and they have applied for a lease on a site on the inner harbor. Mr. Leon Fighiera, manager of operations, is one of the leading spirits in the concern.

(Continued from page 101)

When we reflect upon all that is said and bear in mind whatever else may be urged upon existing orders of things, the conclusion to which we are finally brought is that if our people recognize the drift of events and act in accordance with the spirit of the times, there ought to be no serious difficulties in bringing about an expansion of foreign trade relations that will give us a far more potent influence than this country has ever before exercised in the councils of nations and eventually lead us to become a powerful factor in the maintenance of international peace, which for every country is the greatest of all achievements.

THE TERMINAL WAREHOUSE



Warehouse No. 2

By H. McL. Harding,

Former President, Society Terminal Engineers, New York, N. Y.

THE warehouse is an essential element of a modern terminal. No marine terminal can be a complete success without a terminal warehouse to relieve from congestion the shed and waterfront area. A terminal warehouse differs from the ordinary type of storage warehouse.

Warehouses should be under the control of the terminal authorities in respect to rates and preferential accommodation.

The function of the warehouse is for long storage, a place where freight can be stored as long as the storage rates are paid.

After the freight has been held in the shed for not more than forty-eight hours, possibly less, it must be moved to the warehouse at the expense of the consignee or owner.

A shed is not for long storage, but for temporary holding, during which time the inbound freight is assorted, distributed and tiered, and outbound freight assembled for shipment.

Unless inbound freight is moved from the shed to the warehouse in a short time, the shed, which is only a working area, will soon be congested and the cost of handling will be greatly increased by this congestion, and in addition other sheds must then be erected occupying waterfront space and requiring further investment in piers or quays.

The areas close to the waterfront are of the greatest value and should not be used for long storage. Freight in a warehouse may not be moved for three months, six months or a year, and even longer. Bordering on the waterfront is the scene of the greatest activity of the terminal, and it should not be rendered inoperative or inactive by freight that may not be distributed for months or years. It is more advantageous even when outbound cargoes from the warehouse are being "made up" for freight shipment, that unless it is known when the ship will be ready to receive cargo, that the warehouse be the assembling place instead of the shed.

If, however, there be sufficient room for separate outbound and inbound cargoes in the shed,

then the above rule may be somewhat modified, but the time of holding should always be limited by rule with few exceptions.

Export and import freight should have forty-eight hours and domestic twenty-four hours.

The warehouse, therefore, should be set back from the waterfront, and generally this space is directly to the rear of the shed. Inbound freight generally must be assorted in the shed before it goes into the warehouse.

Where there is sufficient area back of a quay, the warehouse may be placed to the rear and parallel to the shed about sixty feet distant from it, and the freight be moved from the shed to the warehouse by machinery over the shortest distance.

The photograph, designated Warehouse No. 1, illustrates a modern terminal warehouse, nearly completed.

It is constructed of reinforced concrete so as to be fire-proof, and its thick walls help to maintain a fairly even temperature.

The building is about 85 feet in height, with a frontage of 140 feet and 120 feet wide. The front and rear are alike. Eighty to one hundred feet in width is often preferable.

This first story of 19 feet is for assembling and tiering warehouse cargoes for direct shipment or for drayage operations in stormy weather.

A few tiering machines may be used here to advantage, and in connection with elevator service, small motor trucks.

Although the freight may not be often moved to or from or in the warehouse, yet when freight is moved directly between the warehouse and ship, it is necessary that such freight be taken to or from the different stories of the warehouse with the greatest rapidity. One or even two elevators are not sufficient for this work, and outside high speed electric hoists and whips are necessary. This method of operation is the result of experience.

The ship must not be detained in discharging or loading longer than is absolutely necessary.

Here, as in all other terminal operations, speed is the all influencing feature.



Interior view of Warehouse showing columns and sprinkler system

In the usual storage warehouse, not a terminal warehouse, there is seldom the ship's detention, or a loss to the terminal from the berths being too long occupied, to be considered.

In the design of a terminal warehouse this speed element of hoisting and lowering must receive attention. In front and to the rear of each story at the floor level are two projecting platforms, each protected by a railing. To the projections above the top stories are to be attached monorails, upon which will move automatic traveling electric hoists. These hoists will transfer the loads between the round and the projecting platforms at each floor.

In the center are two projecting arms to which will be attached stationary electric hoists or whip pulleys. High speed electric hoists will also be installed.

The three strips of oak in front of the center doors of the six upper floors are buffers for the rising loads and hinged so that they can be raised inwardly when the loads are to pass into any story.

The lower story is high and will be arranged for the admission of drays and railway cars.

In comparison to the shed freight movements, which may be said to be almost continuous often during the night as well as during the day, the warehouse freight movements are few. On this account little machinery is used within the warehouse. Such should be small two-ton motor trucks to go from story to story upon the elevators.

To the left of the photograph is the corner of a pier-shed and an ocean steamship berthed on the side of the pier.

Within the warehouse a large elevator should be installed, on one side of which a spiral chute for sliding down certain classes of commodities proves convenient.

On the other side of the elevator is the stairway. Where the warehouse is limited in size and there

is to be another building, one elevator is often installed for the two buildings.

There is an interior view of the warehouse showing the columns and the sprinkler system. The whole structure is built up of reinforced concrete, even the frames and the columns. Instead of the usual iron shutters for the windows, wire glass is now preferred and is satisfactory to the fire underwriters. Two or three railway tracks should be located in front of and often to the rear of each warehouse.



Warehouse No. 1

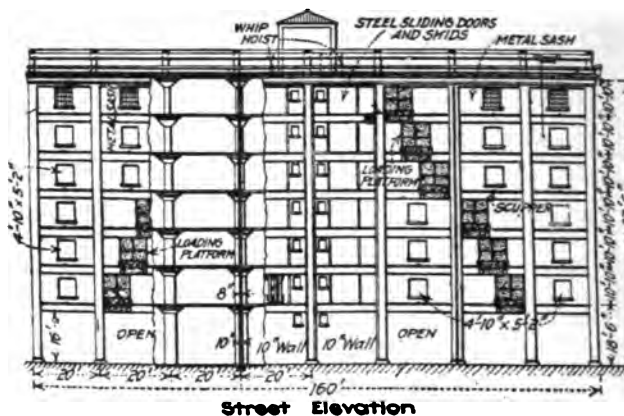
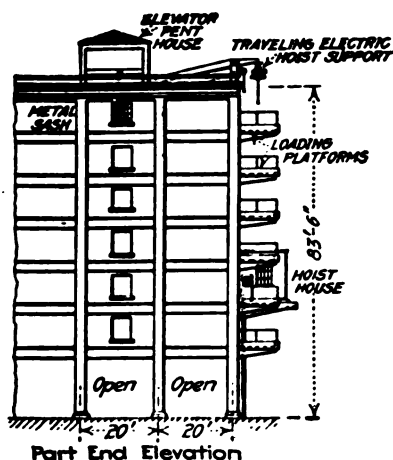
The following may be termed the warehouse freight movements for which provision should be made: From the ship, from the shed, from the quay, and from the pier to the warehouse, and vice versa from the warehouse to the above. These movements should be by railway cars, large drays, motor trucks or by overhead carriers.

Warehouses should have such railway and drayway connections as easily and quickly to receive or deliver local or through railway freight.

There should be ample room and the necessary facilities on the first floor for assorting inbound freight as it comes directly from the ship or for the assembling of outbound freight for immediate shipment. Machinery for tiering and loading into cars or drays will greatly facilitate this work.

This warehouse No. 1 is a typical terminal warehouse and may serve as an example. The location of the projecting platforms and the stationary whip pulleys can be modified to secure greater speed.

Warehouse No. 2 is also a warehouse, but not so exclusively a terminal warehouse. It can be used as a manufacturing loft, though a warehouse of six stories is preferable, as costing the least per cubic foot. In some cases, where the demand exists and the cost of the land will permit, one-story warehouses are constructed.



One type for heavy machinery and massive castings which cannot be left in the open is about 19 feet in the clear height. Others, for cotton or similar commodities, are about twenty-four feet and are similar to the type at Manchester, England. Warehouses are often located at right angles in respect to the waterfront or in some cases may be diagonally placed, possibly about 45 degrees. This diagonal arrangement offers, besides other advantages, a more satisfactory track layout. Modifications of any layout are often unavoidable, due to local conditions, but it is the desire of the Society of Terminal Engineers to establish

certain terminal principles and to conform to these as far as is commercially possible.

A terminal warehouse connected with an active marine terminal whereby freight is transferred to such a warehouse from the sheds constitutes an excellent, permanent, safe investment.

Conclusions

First: A marine terminal warehouse differs from the ordinary warehouse in respect to the design to obtain speed of delivery and receiving freight.

Second: A marine terminal warehouse should be located and designed so as best to co-ordinate rail and water transportation.

New York Prepares for Foreign Trade

Address by Alfred I. duPont

MY purpose in acquiring the Grand Central Palace for the home of the Allied Industries Corporation is to establish a point of contact between commercial United States and the rest of the world in the development of foreign trade.

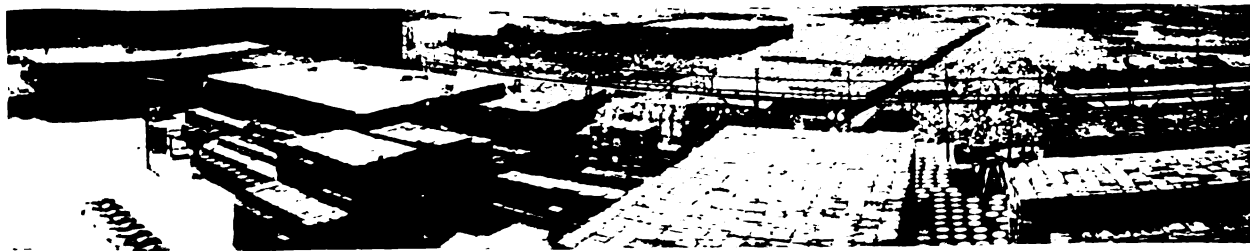
The vision of the position which this country may occupy in the markets of the world, if it takes advantage of its present opportunity, is not exclusively mine. Many men have dreamed it, but it remains for someone to realize that dream, and it is hoped that through the Allied Industries Corporation this may be done.

Foreign trade is not, however, a one-sided matter. It does not consist solely of selling your products to other countries—it consists of selling to them and buying from them, reciprocally. It consists, further, in the establishment, through trade relations, of greater international understanding, of appreciation for permanent business alliances with their nations and other peoples which will result in closer world-friendships. This is the antithesis of present world conditions, except insofar as concerns the Allied nations. It is my hope and belief that through the plans we are developing around

the Grand Central Palace, the alliances we have made for purposes of war will be cemented and strengthened for the years of peace that are to follow.

At the Hague there is a peace palace that stands for something very definite in the world, however circumstances may have nullified its immediate practical usefulness. It is my hope that here in New York there shall stand a palace that is no less for peace, though its function be to promote foreign trade and closer international understanding, which is the basis of peace.

It is all very well for us to talk of these things, but it seems to me the thing to do is to create some very definite focal point around which these thoughts can be crystallized into acts. Therefore, the Grand Central Palace is to be something more than an executive building for a great business corporation, representing only an exclusive group of manufacturers. While we shall assemble there the American-made goods of our Allied industries, which are to be offered to the buyers from other countries, and reciprocally, foreign-made goods that are seeking an entry to the markets of the United States, the Grand Central Palace under its new



A large trade has been developed between the Orient and this country, through the port of Seattle, in soya bean, cocoanut, peanut rapeseed and other more expensive oils

direction will become also the assembling place for the commercial thought of the whole world.

New York is very definitely the gateway through which American goods must go out to the markets of Europe and South America, just as it is the gateway through which the products of these countries must largely enter the United States. It is not that we wish to narrow the gateway, but rather to broaden it, very definitely locating its place, and for the future we hope to bring together these buyers of all the world under one roof in this city, in order to facilitate the exchange of commodities and the interchange of ideas. Our expositions of domestic and foreign goods will become—like the Leipsic Fair—events of world-wide importance and should attract an increased number of buyers.

Further, to develop our plan, it is proposed to centralize here, as far as possible, the entire flow of foreign trade. It has generally been thought that the palace was to be used only by such groups of manufacturers as were allied with the Allied Industries Corporation. This is not correct, since the purpose is, as I have said, to make it the focalized center of all our foreign trade activities.

The Grand Central Palace will become, in this spirit, the home of a commercial union of nations, a formal association as definite as "The League to Enforce Peace", the object of which will be to foster reciprocal international trade relations, the establishment of international customs tariffs, standardization of merchandise, the promotion of international legislation affecting trade relations, and of international good will and co-operation. It will investigate international market requirements and international natural resources. It will tabulate international exporters and importers for the service of buyers and sellers and disseminate information on these subjects. International trade-marks and patents will be listed and international financial investigations made and kept on file. In other words, the Commercial Union of Nations will become the connecting link between the already organized trade associations of the entire world.

In conjunction with this will be operated the Allied Club, an international club affording all of the usual and some very unusual club privileges to its members, who will be foreign and domestic importers and exporters, brokers, bankers, lawyers, shipping men and commercial agents. Membership in this club will include all of the proposed branches at London, Paris, Milan, Brussels, Lisbon, Shanghai and Tokio.

Through the club's information bureau, its members will be entitled to the use of all the data gathered by the Commercial Union of Nations, and when in New York to the use of the club rooms, conference rooms and reading rooms, writing rooms and library, together with the great convention room and banquet hall. It is rather absurd that

there is no place in New York, other than some hotel, for great gatherings of world business men assembled in a spirit of co-operation.

The World's Fair will be opened in 1920-21 and will operate for the first two years in New York, and thereafter every third year, alternating with London and Paris. This will occupy seven of the twelve floors of the Grand Central Palace for a period of three months, showing the products of representative international industries and bringing together the world's leading manufacturers and buyers, regardless of whether they are associated with the Allied Industries Corporation or not. One thousand of these will be invited to visit the fair as the guests of the Allied Industries Corporation, and this gathering will resolve itself into the first International Trade Convention to consider international trade problems.

Other expositions will follow in their turn, so that throughout each year there will be a succession of these modern educators—one dealing with goods "Made in U. S. A.", and intended to popularize that mark; another with seasonable exhibits of domestic goods, and still another to be known as "The World's Wants Exhibit" to educate American manufacturers and others in the raw products of the world and the uses to which they may be put.

Permanently, the Grand Central Palace will be the executive offices of the Allied Industries Corporation and its activities as the central selling organization for the manufacturers and producers of the world, and also for the French-American Constructive Corporation, the function of which is to assist in the rebuilding of certain sections of devastated France when hostilities happily shall have closed.

Together with all of this, there will of necessity be the conduct of the broadest campaign of education possible to promote, beyond the immediate reach of the influence of the Grand Central Palace, the principles of good will and international understanding generated there. This influence is to be made to radiate as widely as possible through a comprehensive system of public education through the co-operation of other associations, by its own publications, and, it is hoped, through the friendly co-operation of the press which will interpret these various activities in their full significance.

This is the work we must set out to do to gain for America its fair quota of world trade, but by methods which we believe are in harmony with the thought of those nations which are today allied in opposition to another method which is passing.

The general plans laid down for the Allied Industries Corporation are formulated to co-operate very closely with the various domestic and foreign trade bureaus of our Government and to work in harmony with the various international foreign trade bureaus of the Allied and neutral Governments.



What Seattle has achieved in this connection, other ports will be able to accomplish with the shipment of various products to and from foreign countries

Shipbuilding at Los Angeles

By Clarence H. Matson

Traffic Manager, Harbor Department, City of Los Angeles

EIGHTEEN months ago shipbuilding was practically unknown in this locality. Only five or six small vessels had ever been turned off the ways south of San Francisco Bay, and the idea of creating a great shipbuilding industry here appeared preposterous. But a company was organized for that purpose, and a lease of a site for shipbuilding purposes was granted to it by the city.

A year ago this company had a contract for eight steel ships of 8,800 tons each, at a total price of approximately \$10,700,000. Now this number has been increased to forty ships at an aggregate price of approximately \$75,000,000. Not only are the hulls built in the yard, but so are the engines and all other machinery, as well as all furniture and other furnishings. The first contract is nearly completed, and there have been a number of launchings on the second contract. More than 10,000 men are employed in the yard, and the number is constantly increasing. In addition to the four sets of ways originally planned for the yard, two more sets have been put down and another outfitting wharf has been built.

Another steel shipbuilding yard has been established on the area originally held under lease by the Pacific Wharf & Storage Company. The new corporation is known as the Southwestern Shipbuilding Company, and it has built an exceptionally good plant, with four sets of ways already established, and two more to be put down. The first hull built by this company was launched during October, and it has contracts for twenty-three steel ships, aggregating about \$40,000,000, and is employing more than 2500 men. This number probably will be doubled within ninety days.

Two wooden shipyards, the Fulton Shipbuilding Company and the Ralph J. Chandler Company, have contracts for eight and six ships, respectively, part of which have already been delivered. They employ more than 1000 men.

It is estimated that there are approximately 14,000 men now employed in the shipyards at Los Angeles Harbor, and about 2000 additional at Long Beach. About 4000 more are employed on ship work in the machine shops and other industries of the city, making a total of 20,000 men employed in the shipbuilding industry of this community.

It is said that these men are paid an average of \$6.00 a day, or \$120,000 a day for the industry, which means more than three and a quarter million dollars a month.

Two other steel shipbuilding yards have been projected, to one of which, the Southern California Shipbuilding Corporation, a lease has been granted covering a site at the north end of the West Basin. The other, the Craig-Wilde Shipbuilding Company, has an application pending for a lease covering approximately thirty acres, east of the Wilmington Basin.

Owing to the fact that the Emergency Fleet Corporation has adopted a policy of granting no more contracts to new steel yards because of a lack of material at present, it is doubtful whether these two yards will be able to proceed with their

plans. Unless the Southern California Shipbuilding Corporation begins the improvement of its site within ninety days from the effective date of the lease, the grant will lapse automatically.

Two additional wooden yards also are projected to build small wooden vessels or large tugs for the Emergency Fleet Corporation. If the plans for these are carried through, they will be located on the Mormon Island Peninsula.

The National Engineering Corporation has been awarded a contract for installing the machinery in wooden hulls and outfitting wooden ships. For this purpose the company is utilizing Shed No. 2, Pier A, paying the city for the use of the shed on a storage basis, and paying dockage on the hulls at the regular dockage rates established for that purpose.

Applications also are pending for the use of the Water street wharf and shed for similar purposes.

There have been numerous projects also for building reinforced concrete ships, and at this writing we have pending an application from the French-American Shipbuilding Corporation for a lease on approximately thirty acres for building concrete ships.

Thus within a period of a few months the shipbuilding industry of Los Angeles harbor has assumed colossal proportions.

With the re-organization of the Fellows & Stewart Company, Incorporated, another shipbuilding concern entered the local field, making five concerns now operating here. The new company has started business under the corporate name of the West Coast Shipbuilding Company. It has a representative in Washington seeking contracts for the construction of wooden steamers, and within the last few days has applied for the lease of a portion of what is known as the Water street shed in the Wilmington basin. This shed was built by the Harbor Commission, and is partially occupied. Additional land on Mormon Island has been secured by the West Coast Company. The officers and stockholders compose one of the oldest concerns in the harbor. They engaged in business many years ago in the construction of pleasure launches; then fishing launches were added with the increase in the number of canneries, and at present the company is preparing for the construction of 3500-ton wooden steamers.

Rogers, Brown & Company, importers and exporters, announce the affiliation with their head office at Seattle of Mr. A. R. Hilliard in the capacity of assistant sales manager, beginning October 1st, 1918. Mr. Hilliard is well known in the Northwest, and has a host of friends who wish him well in his new location. A native of New York, Mr. Hilliard emigrated west in 1911, and has been engaged successfully in the advertising and later as manager of the truck department of the Eldridge Brick Company of Seattle.

The Fireman's Fund Insurance Company announces the removal of their marine and automobile departments at Seattle to new and enlarged offices at 309 Colman Building.

The Antiquity of Various Iron and Wood Planking Fastenings for Wooden Ships

By A. K. Armstrong

Formerly Assistant Engineer in Forest Products, Forest Products Laboratory, Madison, Wisconsin



UPON the Pacific Coast, and to some extent among ship architects and builders in general, there is a tendency toward the use of all-iron planking fastening. The pinch of temporary scarcity of good treenails of requisite size has served to accelerate this tendency; and in order to justify the practice of using iron alone, those decrying the use of wood fastening have advanced some arguments which the writer believes are not justified by the evidence available. That apparently most widely circulated is, that treenails are an archaism surviving from the days when metals were scarce and expensive, especially in manufactured forms. Now that iron is plentiful and cheap(?) there is no necessity for using treenails. Metal fastenings are stronger than wood anyway, or so the argument runs.



It was probably this, as well as other arguments, that led to the conditions mentioned by Commander Richard W. Meade, U. S. Navy, in his treatise on naval architecture and shipbuilding, printed in 1869: "Treenail fastening has gone out of date at the present time, except in small vessels engaged in the coastwise trade." Ever since that time treenails have again swung into favor; but because the tendency is again towards a discontinuance of their use, the charge of archaism against them, and, indirectly, that of lack of progress against those who use them, requires consideration.



It is the purpose of this article to present evidence relative to the antiquity of wood and metal planking fastenings. It will be shown that this evidence points towards the substitution of wood for metal, rather than the reverse; and that the probabilities are that both kinds of fastenings have been used together from time immemorial, but that treenails have gradually replaced metal as the main planking fastening for wooden ships.



Much of the information given in the following paragraphs of this section has been assembled from "Sailing Ships and Their Story," by E. Keble Chatterton, London, 1909—a very excellent work based upon a large number of ancient and modern works relating to ships. Unless otherwise noted, the quotations given are taken from Chatterton's book. Speaking of the prehistoric dug-outs unearthed in England at various times:



"Almost all were formed out of single tree trunks of oak and afforded evidence of having been hollowed out with blunt tools such as the people of the Stone or Bronze Age would possess. Two obviously later boats were dug up in 1853, and were found to be of more elaborate construction, planks having now been introduced. * * * For fastening the planks to the ribs, oak pins and metallic nails had been used.



"We come now to the Bronze and Iron Ages. * * * But now that the introduction of metals, of iron and bronze, is made, the primitive man finds that his sphere of energy is vastly widened. Instead of hollowing out the tree, he cuts it up into planks, instead of having to sew the outside together with thongs of hide, he has metallic nails as fastenings. To the same kind of ribs that framed



his skin-boat, he can now nail down planks of oak and fir.

"The first historic account that we possess of these more modern vessels is to be found in Caesar's account of the Naval Campaign against the Veneti in the year 54 B. C. * * * The cross-beams, made of logs a foot thick, were fastened by iron spikes as thick as a man's thumb. The anchors were made fast by iron chains instead of cables. * * *

Referring to ancient Greek ships:

"Nails of bronze and iron, and pegs of wood were used for fastening the planking, the thickness of the latter varying from $2\frac{1}{4}$ to $5\frac{1}{4}$ inches."

Athenians describe a ship built by Archimedes in 250 B. C. She was fastened throughout with copper bolts, none weighing less than ten pounds each. Eight of her twelve anchors were of iron.

Several attempts have been made to raise the galleys of the Roman Emperor Caligula (A. D. 37-41) from the bottom of the Lake of Nemi. The results of the first attempt in the Middle Ages disclosed the following facts:

"The nails were found to be of bronze, whilst in length some were as much as a cubit * * * and the vessel to be sheathed with lead, covering a stiff lining of woolen cloth padding fastened on by bronze studs outside. It is important to note that the ancients in 37 A. D. had the good sense to realize what Sir Phillip Howard and other naval authorities in the time of Charles II did not discover until the year 1682, that lead sheathing round a ship, used with iron nails, was bound to set up corrosion."

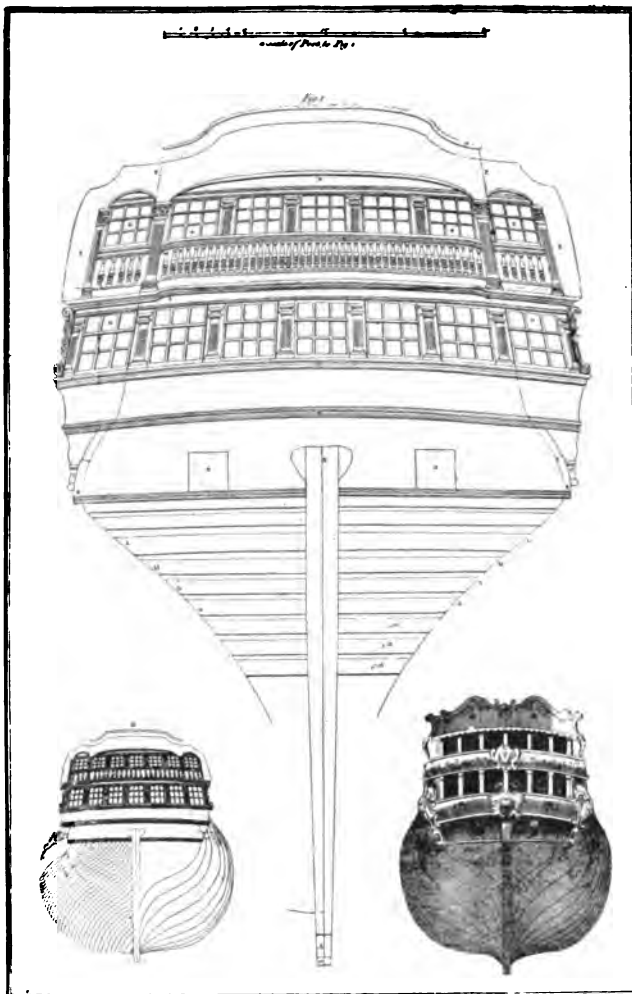
Further attempts to raise these galleys in 1535 and 1905 led to the following discoveries:

"The pegs were of oak, and many bronze nails in perfect preservation were rescued from the deep."

Several of the Viking ships unearthed in recent years also furnish data upon the subject:

"The Nydam ship was discovered in October, 1863, in the Nydam Moss to the northeast of Flensburg in the Duchy of Schleswig. * * * The planks were fastened with large iron nails. She was 77 feet long, as much as 10 feet 10 inches across her midships. * * * Her date has been estimated at about the middle of the third century of our era. * * *

In the photograph of the Gogstad Viking ship,



According to our dictionary—"The posterior face of a ship; or that part which is presented to the view of a spectator, placed on the continuation of the keel behind"

discovered in 1880, which was 79 feet long, $16\frac{1}{2}$ feet beam, and six feet deep amidships, the heads of the nails or spikes fastening on the planking are very evident.

From the Sagas of the Norsemen much may be learned relative to the various trades engaged in the construction of a ship:

"Besides these came also the joiners, nail-makers, blacksmiths and other workmen."

The chronicles of the eleventh century (the days of William the Conqueror) also furnish indirect evidence:

"Nor was shipbuilding neglected in other parts of Great Britain, for Hakluyt gives a chronicle of the Kings of Man, in which we find that Godredus Crovan, who gathered together a fleet of ships and sailed to the Isle of Man, vanquished its people, and subdued Dublin, and so tamed the Scots that none of them durst build a ship or a boate with above three yron nails in it."

The well-known mediaeval tale in the "Arabian Nights" entitled "Sinbad the Sailor" recounts that ships sailing past a certain mountain were destroyed through the loss, by magnetic attraction, of the fastenings which held them together. This fable would have had no point whatsoever had not the ships of the seafaring Arabs of these days (they made regular voyages to China) been so dependent upon iron fastenings that the loss of them caused the vessel to fall to pieces.

European travellers of the fifteenth and sixteenth centuries almost invariably remarked that the ships of the Gujerat, in India, and other parts of the Orient, were fastened entirely with wood * * * a point that would scarcely have attracted attention had not metal fastenings played an important part in the construction of their own ships. It was this ancient practice of wood fastening that probably gave rise to the fable of the magnetic mountain alluded to above.

The following quotations should explode the theory that the past use of treenails has resulted from a scarcity of metal in manufactured form:

"Of these the 'Regents,' of 600 tons, was inspired by French architecture. She was built on the Rother about 1490 and carried 225 serpentes."

The latter were iron or brass breech-loaders of small calibre.

Of the "Henri Grace 'a Dieu", built for Henry VIII, it is remarked:



"Her tonnage was 1500. * * * Her armament, according to her existing inventory of 1514, included 184 pieces of ordnance, of which 126 were brass and iron serpentines."

"The 'Murriam' was brought into the Royal Navy in 1545 * * * and she had * * * 10 brass guns and 53 iron guns."

"The 'Struse of Dawske' had been purchased in 1544. * * * Her tonnage was 450 and she carried. * * * 39 iron guns, but none of brass."

"Another ship * * * the 'Jesus of Lubeck,' purchased * * * in 1544, shows steel sickle-shaped billhooks affixed to the yard-arms."

"In fights, when the sickle-shaped bill-hooks already mentioned were used by the enemy, the opponent would sling his yard in chains."

"The 'Ark Royal, carried three lower anchors of 20 cwt., as well as three others and grapnel."

These were of iron.

Nettings were drawn over the waist of these ships "to intercept missiles dropped from the fighting tops of the enemy."

"These nettings were at first made of metal chain, but in the time of Elizabeth they were of rope."

All of these forms required more skill in manufacture than a spike or bolt. That iron was plentiful enough is indicated by the statement:

"Iron was bought by the ton and worked up in the royal forge into nails and spikes, etc."

This was in the beginning of the sixteenth century. In Spain this was also the case, since, of the ships of the Great Armada, which sailed against England in 1588, it is said:

"The seams opened in spite of the strength with which they had been put together. They were bolted with iron spikes and it was not long before these ships became 'nail-sick.'"

It is peculiar that the argument relative to the scarcity of metal in those days is advanced, when the plentiful and intricate ironmongery of that age, which still survives, is considered. The inventory of supplies for Magellan's voyage round the world fairly rings with iron, in forms far more intricate than those of the nail, spike and bolt. It is only necessary to consider the weapons and body armor of the sixteenth century alone to realize with what skill iron and steel were worked, both then and previously.

In the early part of the seventeenth century "we find that the planking of a vessel of 400 tons was to be four inches thick; ships of 300 tons to have three inch planking, and small ships, two inch, but

never less than this."

This gives some idea as to the problem involved in fastening ships in those days, and also brings the discussion down to the Colonial period of America. Of this, Hall (Tenth Census Reports, Vol. VIII, 1880) writes:

"By 1645 they had sent a 'ship and other vessels' from Boston to the banks, to fish, Lechford stating in his 'Plain Dealing; or News from New England,' that at this time the people of the colony 'were building of ships, and had a good store of barks, catches, lighters, shallops, and other vessels.'"

The small and light craft mentioned were unlikely to have had frames of a size that would have made the use of treenails, based upon the sizes necessary for safety, a desirable practice.

The settlement of New England resulted largely through England's desire to supplement the supply of fish from the teeming waters of North America. For that reason she urged her shipwrights to come over and exercise their skill upon the production of fishing vessels * * * the plentiful forests of large trees making it possible then, as at all times, to produce wooden ships more cheaply than in the mother country. As trade increased these shipwrights built larger and larger ships. Hall cites a contract of 1695 at Charlestown, Mass., for a "new squaresterned ship" of best white or black oak, 82 feet long on the keel and 25 1-3 feet beam * * *, "the fastenings to be chiefly with treenails of oak. * * * All materials to be provided by the builder, except iron work, nails, and carvers' and joiners' work."

This liberal use of treenails might well lead to the belief that even in the short time which has elapsed since the founding of the Colony the transplanted shipwrights had evolved a new system of fastening. However, the practice in England in the same century is described by Chatterton:

"In Charles II's time the planks and timbers were fastened with treenails or hard wooden pins, * * * the best trees for this purpose were grown at Shot-over and Stow Wood, Oxfordshire."

In other words, the treenails were made of English oak.

Since the use of treenails at this time may also be construed as meaning a scarcity of iron, a further quotation is given from Chatterton:

"With regard to the iron used, by 1636 there were as many as 300 iron works in the country (England). Iron nails were stolen in such large quantities that the systematic marking of navv-

stores was begun about the time of the Restoration."

It is unlikely that if England was so well supplied that the Colonies need suffer. As a matter of fact, England had some of her warships built in New Hampshire, since Hall writes:

"The Portsmouth builders made a great reputation, and, in consequence, large vessels and frigates were ordered from them. The Faulkland, a 54-gun ship, was built as early as 1690; and America, 50-gun, in 1740, for the British Government. * * *

These ships, when judged by the standards of the time, required a considerable quantity of iron in their fittings and furnishings, in order to make them capable of going to sea.

While it might be thought that the builder of merchant ships in those early days of the Colonies could not afford iron, if iron was necessary, it must be remembered that at that time, as well as later, the New England builder was often the owner or part owner of the ship; carried his own and his friends' cargoes; shipped his relatives and friends as a crew; and frequently navigated her himself. It is not likely then that with all he had at stake a builder would, however great the expense, omit anything from the construction of a vessel that in his opinion would jeopardize her safety.

As time went on, American shipbuilders reduced shipbuilding and design to a science, and more and more improved both design and construction. Until the wooden ship was driven from the high seas by foreign and subsidized steel ships, the study was carried on with unremitting zeal. The best argument that they did not blindly follow this English practice of fastening planking is the substitution of the locust treenail for that of oak. The cult of oak still prevails in Europe, to a large degree, in all industries, but the American shipwright never hesitated to turn to other species which are considered as good or better for any portion of his ship. The American builder never was backward in making radical innovations in old practice. However, he himself was sometimes to blame for the charge of prejudice and absolute conservatism. Thus Capt. E. P. Dorr, proprietor of the Lake Vessel Inspection, in an address to the council which framed the lake "rules" for the construction of wooden vessels, about 1874, stated:

"I have in my possession some of the small

hand-hammered spikes with which she (Father Hennepin's boat) was fastened, and to this day the fastening of planks, in Lake vessels, is of iron spikes, with through bolts in the larger craft."

This would seem to indicate that spikes were used on the lakes in the nineteenth century, because a French missionary in the seventeenth century had fastened his boat with them, whereas the real reason for the practice is given by Hall, in the following words:

"The shape of the hulls of the lake schooners permits the use of a great deal of straight timber in the frames. The floor timbers, and for a long distance amidships, the top timbers also are nearly straight. It is the practice, therefore, to cut the frames out of heavy plank (or flitch, as it is called) five, six or seven inch flitch being used, according to the size of the vessel, the spacing of the frames being as a rule from 20 to 22 inches. The comparative thinness of the timbers rendering injudicious the use of treenails for fastening on the plank, iron bolts and spikes are used instead. The planking is usually square-fastened with two spikes and the two iron bolts in each frame, but the practice varies, in some vessels three spikes and one bolt being used, in others four iron bolts."

The lake rules themselves show that spikes were considered a second choice to treenails, but the circumstances mentioned by Hall forced the use of spikes and bolts.

It is the opinion of the writer that the evidence available points towards the substitution of wood for metal in ship fastening, rather than the reverse. It is quite probable, however, that such fastenings have been largely used together from very ancient times, but that the treenail has gradually replaced metal as the main planking fastenings. In any case, the evidence presented in this article leads the writer to the conclusion that treenails are not a makeshift due to any lack of metal in past centuries, nor are they an archaism due to prejudice and lack of initiative, but the results of deliberate consideration and observation. The shipwrights who used them (and they were the best in the world) in the Golden Age of the American ship, and many of those who

still use them did and do believe that they are as essential to the well-being of the ship as metal fastenings, and possibly more so. A close study of the properties of metals and wood leads the writer to the same conclusion.

The illustrations appearing in Mr. Armstrong's article are taken from a copy of "Universal Dictionary of Marine," or as the author of the Dictionary, which was published at London, in 1789, would have it, "A Copious Explanation of the Technical Terms and Phrases Employed in the Construction, Equipment, Furniture, Machinery, Movements and Military Operations of a SHIP Illustrated with Variety of Original Designs of Shipping, in Different Situations, Together with Separate Views of their Masts, Sails, Yards and Rigging." The Dictionary, which is one hundred and twenty-nine years old, was compiled by Mr. William Falconer, and is a gem. When perusing it one cannot help but feel some of the romance that made the sailing ships of old so fascinating, for the definitions given would prove an inspiration to any "old salt" reading it. For instance, the sailing ships illustrated in this article are described as follows: Fig. 4 exhibits a frow under fail; fig. 5 represents a ketch at anchor; fig. 6 a brig or brigantine; fig. 7 a bilander; fig. 8 a xebec; fig. 9 a schooner; fig. 10 a galliot; fig. 11 a dogger; all of which are under fail; fig. 12 and 13 two gallies, one of which is under fail and the other rowing; and fig. 14 a floop. The ketch, whose fails are furled, is furnished with a try fail, like the frow, and it has a fore-fail, fore stay-fail, and a jib, nearly similar to those of a floop, but the fails on the main-mast and mizzen-mast are like those of a ship. The main fail and main top-fail of the brig are like those of the schooner; and the fore-mast is rigged and equipped with fails in the same manner as the ship and frow. The fails, masts and yards of the xebec are extremely different from those. In the schooner both the main-fail and the fore-fail are extended by a boom and gaff, as likewise is the floop's main-fail; the fails of the dogger and the galliot are sufficiently expressed in the plate; and finally the gallies are navigated with lateen-fails, which are extremely different from those of the vessels above described.

American Seaports

By H. McL. Harding
Terminal Engineer, New York City

ALL that most ports need for the present is to discharge and load ships, barges and lighters with more rapidity—that is, three times faster than is done at present—utilizing their often present extensive piers and bulkheads. This is easily, quickly and economically possible.

To do this, there must be no congestion points, either on the side of the pier, on the pier, at the entrance to the pier, or elsewhere.

The above is equivalent in results to increasing the present berthing frontage three times. In addition, the short holding areas must also be equivalent in holding capacity to three times as much. This is to be taken as an average.

No one would question that, if there were three times as many piers and bulkheads as at present, many ports would have a great surplus.

But only is this three times increase possible with the present linear frontage and surface area, but the American terminal engineer naturally can improve on foreign installations in adapting them to American conditions.

Many other foreign ports having similar unfavorable conditions have obtained this three-fold result. These pioneers learned their lesson many years ago, being forced to it by an active mercantile marine. They have written down the exact number of tons they were transferring when their conditions were the same as at certain American ports and what the tonnage was after improving. They employed water (hydraulic), steam (the engine), and electricity (the travelling hoist).

At first the various ports tried different methods, but finally almost all foreign ports followed practically the same terminal principles.

A barge and lighter, even when two were lying side by side, and even without masts, were unloaded by their mechanical appliances, which would have been impossible with cargo masts.

A space alongside of the pier, 8 feet by 8 feet (64 square feet), easily congested by one or two winches per hatch, was not what they used for discharging ships, but served a space 40 feet by 100 feet, or 4,000 square feet, without rehandling or moving the machine. By these machines, combined with the ships' winches, six packages or drafts were going through the air at one hatch at one time, instead of as is usual at Pacific ports—one, or at the utmost two, drafts.

Instead of building new piers, by an investment of one-tenth the cost of a new pier, they obtained equivalent results. These port engineers from their experience realized that operative conditions were the factors of the greatest importance, and that a one-story shed without columns, without elevators, without chutes, without other floor incumbrances, were far less easily congested than when these unavoidable elements of a two-story shed were present. They also knew that a one-story shed, 30 feet clear space beneath the trusses, had a greater holding capacity than a two-story shed thirty-six feet in height. In the one-story shed there were no obstructions, greater speed and less cost of operation and less initial investment. They had learn-

ed from daily operation the value of conserving floor space, utilizing unoccupied air spaces, and the necessity of co-ordination between the railway car and the vessel.

Although not in their records, such early port officials probably made their trial by error, which mistakes should not today be repeated by those just entering into a new era of port development, due to a great merchant marine and a domestic and foreign commerce unequalled in the history of the world.

There can be no doubt which will be the great port of the Pacific, whose commerce will equal that of the port of New York, if it will avoid the mistakes of the past and profit from the experience of others.

All steamers built in San Francisco and San Pedro and turned over to the Navy Department for operation will be outfitted with crews from the local Naval Reserve Training Station. This information was given out by officers of the station recently. In the last month, three steamers have been outfitted with crews from the station here—the "West Galeta," the "Ozaukee" and the "Cawtaba." The former was constructed by the Los Angeles Shipbuilding & Drydock Company, the "Ozaukee" by the Long Beach Shipbuilding Company, and the "Catawba" by the Fulton Shipbuilding Company.

RULES GOVERNING UNLOADING OF RESTRICTED COMMODITIES

The War Trade Board has notified all shipping companies and shipping agencies that vessels sailing from foreign ports on or after October 1, 1918, will not be permitted to unload any shipment of restricted commodities for importation into the United States, except coin, bullion, and currency, unless such shipment is covered by an invoice duly certified by the appropriate United States consular officer, or unless said shipment is covered by one of the "PBF" or general licenses, and that, if any shipping company shall bring to the United States any restricted commodity not so covered by such consular invoice, said company will be compelled to return said commodity to the port of origin at its own expense. Shipping companies will be protected, however, in accepting freight, provided they make certain that the invoice covering the commodity has been duly certified by the American consular officer.

This policy has been made necessary by the fact that, since the restrictions upon imports became effective, many shipments have arrived at United States ports, for importation of which no licenses have been issued. These shipments have, in many instances, been unloaded and have caused great congestion of the docks and warehouses.

It is expected that the precautions now taken will prevent this, and thus facilitate the handling of foreign trade as well as the enforcement of the import restrictions adopted for the purpose of conserving tonnage.

What the United States Shipping Board Has Accomplished with the Co-operation of Our American Shipbuilders

WITHIN the jurisdiction of the United States Shipping Board, on September first, 1918, there are 2185 seagoing vessels, totaling 9,511,915 deadweight tons. Of these, 1294, totaling 6,596,405 deadweight tons, fly the American flag. Under charter to the Shipping Board and to American citizens there are 891 foreign vessels, totaling 2,915,510 deadweight tons. At the time the United States entered the war the American merchant marine included approximately only 2,750,000 deadweight tons of seagoing vessels of over 1500 deadweight tons. The expansion of the fleet within the jurisdiction of the Shipping Board has come about for the most part during the past year. This fleet lists as follows on Sept. 1, 1918:

3,017,238 deadweight tons, is nearly four times all the seagoing tonnage (of over 1500 deadweight tons) built in the United States in any four prewar years. The total launchings since the first of this year, 482 vessels, of 2,392,692 deadweight tons, are more than eight times the seagoing tonnage (of over 1500 deadweight tons) produced in this country in any prewar year.

In the four prewar years, 1913-1916, according to the Bureau of Navigation of the Department of Commerce, this country built 107 seagoing steam vessels of over 1500 deadweight tons, totaling 805,037 deadweight tons. The high mark of prewar production in the United States of seagoing vessels of over 1500 deadweight tons was reached in

	Num-ber	Dead-weight tons
Requisitioned American merchant ships	449	2,900,525
Ex-German and Ex-Austrian ships taken over by the United States Government	100	644,713
New Ships owned by United States Shipping Board.....	256	1,465,963
Old Lake steamers transferred	31	117,800
American merchant ships not yet requisitioned (of over 1,500 dead-weight tons)	377	980,459
Dutch steamers requisitioned	81	486,945
Foreign ships chartered to United States Shipping Board.....	291	1,208,411
Foreign ships chartered to American citizens	600	1,707,099
Total	2,185	9,511,915

Expansion of Our Merchant Marine

The American merchant marine is today expanding more rapidly than any other in the world. In August of this year the United States took rank as the leading shipbuilding nation in the world. It now has more shipyards, more shipways, more shipworkers, more ships under construction, and is building more ships every month than any other country, not excepting the United Kingdom, hitherto easily the first shipbuilding power. Prior to the war the United States stood a poor third among the shipbuilding nations.

Since August, 1917, more seagoing tonnage has been launched from American shipyards than was ever launched before in a similar period anywhere. The total, as of September 1, 1918, 574 vessels, of

1916, when there were built 38 vessels, of 285,555 deadweight tons.

The Rate of Progress

The rapid progress American shipbuilding has made in the first year of the present Shipping Board is shown by the table below.

Deliveries

More than 2,000,000 deadweight tons of new ships have been completed and delivered to the Shipping Board during the past year. The first delivery was made on August 30, 1917, by the Toledo Shipbuilding Company of Toledo, Ohio. The first million tons of completed ships were obtained in May; the second million in August. The deliveries to the Shipping Board in August broke all world's records in the production of ocean-going

Launchings (August, 1917-18, inclusive)

Date	Wood ships		Composite Ships		Steel contract Ships		Requisitioned Steel Ships		Total	
	Num-ber	Dead-weight tons	Num-ber	Dead-weight tons	Num-ber	Dead-weight tons	Num-ber	Dead-weight tons	Num-ber	Dead-weight tons
August, 1917							16	127,055	16	127,055
September, 1917							12	61,930	12	61,930
October, 1917							19	131,126	19	131,126
November, 1917					1	8,800	19	135,805	20	144,605
December, 1917	2	7,500			2	17,600	21	134,730	25	159,830
January, 1918					1	8,800	15	103,700	16	112,500
February, 1918	4	14,500	1	4,000	3	21,150	23	132,200	31	171,850
March, 1918	10	36,000	1	4,000	6	51,650	27	167,266	44	258,916
April, 1918	16	55,500	1	4,000	7	45,850	22	119,880	46	225,230
May, 1918	30	108,200	2	7,500	14	85,025	28	164,530	74	365,255
June, 1918	22	78,700	1	3,500	13	74,300	13	77,050	49	233,550
July, 1918	53	187,700	3	11,000	35	218,725	33	216,986	124	634,411
August, 1918	33	111,350	4	14,500	48	176,400	13	88,730	98	390,980
Total	170	599,450	13	48,500	130	708,300	251	1,660,988	574	3,017,238



S. S. "Quoque" delivered to the Shipping Board by the Wilson Shipbuilding Company of Astoria, Ore.

tonnage and established the United States as the leading shipbuilding nation of the world. They totaled 338,983 deadweight tons. Those from American shipyards to the Shipping Board in August totaled 313,380 deadweight tons, exceeding the previous world's record for any month, which had been made by British shipyards in May, 1918, by 17,869 deadweight tons. The deliveries to the Shipping Board by American shipyards from August 30, 1917, to and including August 31, 1918, totaled 325 seagoing vessels of 1,941,875 deadweight tons. Adding eight vessels of 66,357 deadweight tons delivered by Japanese shipyards, the grand total of deliveries to the Shipping Board up to September 1, 1918, was 333 vessels of 2,008,232 deadweight tons. The monthly progress is shown in the following table:

The deliveries to the Shipping Board from American shipyards in 1918 to date (September 1) in comparison with the output for the same period by British shipyards show up as follows:

Month	United States	United Kingdom
January	88,300	87,852
February	123,042	150,057
March	161,226	242,511
April	171,413	169,000
May	254,413	295,511
June	278,199	201,238
July	236,079	212,973
August	313,380	187,019
Total.....	1,626,052	1,546,161

To date American shipyards lead by 79,981 tons.

Deliveries by Months
(August, 1917-18, inclusive)

	Requisitioned		Steel contract		Wood contract		Contract, built in Japan		Total	
	Number	Dead-weight tons	Number	Dead-weight tons	Number	Dead-weight tons	Number	Dead-weight tons		Dead-weight tons
August, 1917	1	2,930							1	2,930
September, 1917	7	47,029							7	47,029
October, 1917	13	87,758							13	87,758
November, 1917	18	78,805							18	78,805
December, 1917	11	99,301							11	99,301
January, 1918	10	79,729	1	8,571					11	88,300
February, 1918	15	114,521	1	8,521					16	123,042
March, 1918	19	152,678	1	8,548					20	161,226
April, 1918	30	162,842	1	8,571					31	171,413
May, 1918	36	214,508	6	36,405	1	3,500			43	254,418
June, 1918	35	198,230	9	61,969	5	18,000	2	15,837	51	294,036
July, 1918	19	109,006	18	109,073	5	18,000	3	24,917	45	260,996
August, 1918	22	128,448	19	106,402	22	78,500	3	25,603	66	338,983
Total.....	236	1,475,485	56	348,090	33	118,000	8	66,357	333	2,008,232



One of the record ships delivered to the Shipping Board by the Skinner and Eddy Corporation, Seattle

NOTE. The foregoing table is in dead-weight tons. The deliveries to the Shipping Board do not embrace all construction in the United States. They deal only with seagoing vessels of over 2,500 dead-weight tons built under requisition or contract for the Shipping Board. The figures of production which properly correspond with those of the British Admiralty are compiled by the Bureau of Navigation, which, like the British Admiralty, lists all vessels of over 100 gross tons.

Records Made by Shipyards

The most spectacular achievement in the history of shipbuilding, in this or any other country, was the launching from American shipyards on Independence Day of ninety-five steel, wood, and composite vessels, totaling 474,464 deadweight tons. Thus in one day there were launched 188,909 deadweight tons more than the output of seagoing tonnage (of over 1500 deadweight tons) in the best prewar year of American shipbuilding.

Another world's record was made by American shipyards for the month of July. There were launched in that month 126 steel, wood, and composite vessels, totaling 634,411 deadweight tons. This total more than doubles the launching totals for any month in the history of British shipyards. Before the war British shipyards launched more vessels annually than all the others in the world.

An unprecedented pace of construction marks the rapidly increasing output of tonnage from American shipyards. All records for fast shipbuilding are now held by them. Before the war from nine months to a year were required to build a 3500-ton steel seagoing vessel, from a year to a year and a half to build a 5500-ton steel vessel, and from a year and a half to two years to complete a vessel of 8000 tons and over.

In July and August of this year only thirty-four calendar days elapsed between the keel laying and delivery of the 3500 deadweight ton steel freighter

"Crawl Keys." This world's record was made by the Great Lakes Engineering Works of Ecorse, Mich. The keel of the "Crawl Keys" was laid on July 11. The vessel was launched in the record-breaking time of sixteen calendar (fourteen working) days. On August 13 the "Crawl Keys" was completed, and on the following day it was accepted by the Shipping Board and placed in commission.

Only thirty-seven calendar days were required in May and June to build the "Tuckahoe," a steel collier of 5500 deadweight tons. This sensational pace for war-time shipbuilding was set by the New York Shipbuilding Company of Camden, N. J.

A world's record was made when the "Tuckahoe" was launched ninety per cent complete on June 5 in twenty-seven days two hours and fifty minutes from keel laying. Another world's record was made ten days later when the "Tuckahoe," ready for service, was delivered to the Shipping Board. The "Tuckahoe" was carrying coal to New England on the fortieth day.

The ten fastest built seagoing vessels in the world have come from American shipyards this year. They are:

"Crawl Keys," freighter, 3500 deadweight tons, Great Lakes Engineering Works, Ecorse, Mich., 34 (calendar) days.

"Tuckahoe," collier, 5500 deadweight tons, New York Shipbuilding Company, Camden, N. J., 37 (calendar) days.

"West Lianga," freighter, 8543 deadweight tons, Skinner & Eddy Corporation, Seattle, 78 (calendar) days.

"West Hosokie," freighter, 8800 deadweight tons, Skinner & Eddy Corporation, Seattle, 79 (calendar) days.

"West Hobomac," freighter, 8604 deadweight



A product of the Suple & Ballin Shipbuilding Corporation, Portland



"L. J. Drake" tanker, building at the Ames Shipbuilding and Drydock Company, Seattle

tons. Skinner & Eddy Corporation, Seattle, 80 (calendar) days.

"Lake Narka," freighter, 3530 deadweight tons, American Shipbuilding Company, Cleveland, 84 (calendar) days.

"West Cohas," freighter, 8554 deadweight tons, Skinner & Eddy Corporation, Seattle, 85 (calendar) days.

"West Gambo," freighter, 8554 deadweight tons, Skinner & Eddy Corporation, Seattle, 86 (calendar) days.

"West Ekonk," freighter, 8554 deadweight tons, Skinner & Eddy Corporation, Seattle, 88 (calendar) days.

"West Alsek," freighter, 8529 deadweight tons; "West Apaum," freighter, 8516 deadweight tons, and "West Gotomska," freighter, 8586 deadweight tons. Skinner & Eddy Corporation, Seattle; and "Lake Gardner," freighter, 3300 deadweight tons, Great Lakes Engineering Works, Ecorse, Mich., 92 (calendar) days.

The speed that American shipbuilding has attained this year is further shown by the following launchings made in record time:

Manitowoc Shipbuilding Company of Manitowoc, Wis., launched the 3400-ton steel freighter "Corsicana" on August 7, 28 (calendar) days after the keel laying.

Bethlehem Shipbuilding Corporation of Alameda, Cal., launched the 12,000-ton freighter "Invincible" on August 4, 31 (calendar) days after keel laying.

American Shipbuilding Company of Cleveland,

launched the 3550-ton steel freighter "Lake Narka" on May 4, 46 (calendar) days after keel laying.

Baltimore Dry Dock & Shipbuilding Company of Baltimore, launched the 6450-ton steel refrigerator ship "South Pole" on June 17, 46 (calendar) days after keel laying.

Bethlehem Shipbuilding Corporation of Alameda, Cal., launched the 12,000-ton steel freighter "Defiance" on July 4, 46 (calendar) days from keel laying. On the same day this yard launched three other 12,000-ton steel freighters, one of them, the "Victorious," 66 (calendar) days from keel laying.

Shipyards and Shipways

When the present Shipping Board began its work in August, 1917, there were only sixty-one shipyards in the United States. There were thirty-seven steel shipyards with 162 ways. About three-quarters of their capacity had been pre-empted by the naval construction program, while private orders overflowed the remaining ways. In the twenty-four wood shipyards there were only seventy-three ways.

The largest shipyards in the world in September, 1918, are those of the United States. The Clyde River, in Scotland, historically famous as the greatest of all shipbuilding localities, is already surpassed by two shipbuilding districts on the Atlantic Coast and by two on the Pacific Coast—by Delaware River and Newark Bay in the East and by Oakland Harbor and Puget Sound in the West. One yard, Hog Island, on the Delaware, is equipped to produce more tonnage annually than the

Status of Shipyards, as of September 1, 1918

	Yards					Status of completion			Ways					
	Number	For steel ships	For wood ships	For composite ships	For concrete ships	Shipyards practically completed	50-100 per cent completed	Less than 50 per cent completed	Total number	For Emergency Fleet Corporation	Completed		Under construction or to be added.	
											For wood, composite, and concrete	For steel	For wood, composite, and concrete	For steel
Districts:														
No. 1	19	4	15	0	0	13	3	3	90	64	18	33	0	13
No. 2	25	11	14	0	0	19	6	0	138	128	71	42	15	10
No. 3	21	7	14	0	0	15	6	0	75	62	27	32	3	0
No. 4	17	3	14	0	0	13	4	0	69	55	20	41	1	3
No. 5	15	5	9	1	0	11	3	1	53	53	6	35	8	4
No. 6	12	0	12	0	0	0	1	0	55	50	0	50	0	0
No. 7	17	10	7	0	0	14	2	1	94	80	43	25	12	0
No. 8	25	10	15	0	0	22	3	0	123	123	48	73	2	0
No. 9	21	16	5	0	0	19	2	0	112	110	84	14	12	0
No. 10	6	6	0	0	0	5	1	0	53	33	31	0	2	0
No. 11	13	0	12	1	0	12	1	0	57	57	0	54	0	3
Yards independent of districts	5	5	0	0	0	1	1	3	80	80	62	0	18	0
Concrete plants	7	0	0	0	7	0	2	5	22	22	0	1	0	21
Total	203	77	117	2	7	155	35	13	1,020	927	410	400	63	54

output of all the shipyards of the United Kingdom in any prewar year. It has fifty ways.

There are now 203 shipyards in the United States. The list comprises 77 steel, 117 wood, two composite and seven concrete shipyards. Of these, 155 are completed, 35 more than half completed, and only 13 less than half completed. The great plant at Hog Island is 95 per cent completed—built in one year. Its site, when the United States entered the war, was a swampy marsh.

Every month of the past year has added to the number of American shipways, until today the impressive total is 1020—more than double the total of shipways in all the rest of the world. Of the 927 shipways that are for the Emergency Fleet Corporation of the Shipping Board, 810 are listed today as completed, and only 117 are to be added. There are 410 completed ways for the construction of steel ships, 400 completed ways for the construction of wood, composite, and concrete ships.

The status of the shipyard plants is shown in the following summary:

Employees

The records of the United States Shipping Board Emergency Fleet Corporation show that there are now approximately 386,000 employees in the shipyards. There were less than 50,000 shipworkers in July, 1916.

The weekly pay-roll of the shipyards building ships for the United States Shipping Board is \$10,500,000.

Program and Contracts

Here is the program of ship construction which the Shipping Board has placed with the rapidly expanding shipyards of the country:

	Dead-weight tons
2249 contract ships, totaling.....	13,212,712
42 concrete ships, totaling.....	301,500
402 requisitioned ships, totaling.....	2,790,792
2693 ships	16,305,004

The Shipping Board has also contracted for the construction of 170 wood barges, 279 steel, wood and concrete tugs, 100 trawlers and 25 harbor oil barges, totaling 50,000 deadweight tons.

Definition of Tonnage: To make clear the meaning of the different kinds of tonnage, these definitions are given. The term "gross tons" is held to express in units of 100 cubic feet the entire cubical capacity of the vessel, including spaces occupied by cabins, engines, boilers, and coal bunkers. The "net ton" is regarded as equaling 100 cubic feet of capacity, exclusive of deductions for space occupied by cabins, machinery, etc. "Deadweight" tonnage signifies the maximum weight of cargo, bunkers, consumable stores, and all other weight, including passengers and crew.

Recruiting Service

A recruiting service was established June 1, 1917, for the purpose of training American citizens to serve as officers and in the crews of vessels in the merchant marine. Henry Howard of Boston was named director of the service.

Work of training men qualified by two years' experience at sea to serve as deck officers, by means of a short intensive course in navigation, was begun June 4, 1917. The training of men with technical experience fitting them to serve as marine engineers was begun in July, 1917. Training of crews was begun in January, 1918.

The experienced men trained as deck and engine-room officers are recruited through section chiefs of the recruiting service stationed at Boston, Philadelphia, Jacksonville, New Orleans, San Francisco, Seattle, and Cleveland, and at the schools.

Recruiting of inexperienced men, to be trained for service in merchant-marine crews, is conducted at 6854 official enrolling stations, established at drug stores, in all sections of the country.

The status of the service (September, 1918) is indicated in the following summary:

Training Merchant Marine Officers

Officers schools, 32.

Attendance June, 1917, to December 14, 1918, 10,242.

Length of term, navigation schools, six weeks; engineering schools, one month.

Men in classes on August 31, 1918, 1450. Experienced men only admitted.

Training Merchant Marine Crews

Recruits (inexperienced) enrolled for training as apprentice seamen, firemen, coal passers, cooks and stewards, February, 1918, 23,270.

Rate of enrollment, September, 1918, 4500 a week.

Training stations in commission: At Boston (base of Atlantic Training Squadron); New York, San Francisco, Seattle, Norfolk, New Orleans and Cleveland.

Training ships in commission: Based at Boston, the "Calvin Austin," "Gov. Dingley," "Gen. Cobb"; based at New York, the "Dorothy Bradford"; based at San Francisco, the "Iris"; based at Seattle, the "Troquois" and "Chippewa." Training ships fitting out: At New Orleans, the "Mandeville"; at Cleveland, the "Missouri"; at Boston, the "Minnesota" (to replace the "President"). Station ships in commission: At Boston, the "Meade" (ex "City of Berlin"); at Norfolk, the "President"; at San Francisco, the "Ocean Wave."

Capacity of cruising training ships, 4000 apprentices a month.

Total capacity of stations, training and receiving

STATUS OF WORLD TONNAGE, SEPTEMBER 1, 1918

(Germany and Austria excluded)

	Dead-weight tons
Total losses (Allied and neutral) August, 1914-Sept. 1, 1918	21,404,913
Total construction (Allied and neutral) August, 1914-Sept. 1, 1918	14,247,825
Total enemy tonnage acquired (to end of 1917).....	3,795,000
Excess of losses over gains	3,362,088
Estimated normal increase in world's tonnage if war had not occurred (based on rate of increase, 1905-1914).....	14,700,000
Net deficit due to war	18,062,088

Construction of ships in a single month exceeded destruction of them for a similar period, in May, 1918, for the first time since December, 1915.

In August, deliveries to the Shipping Board and other sea-going construction in the United States passed Allied and neutral losses for that month. The figures:

	Gross tons
Deliveries to the Shipping Board.....	244,121
Other construction over 1,000 gross.....	16,918

Total	261,039
Losses (Allied and neutral).....	259,400
America alone surpassed losses for month by.....	1,630

NOTE.—World's merchant tonnage as of June 30, 1914, totaled 49,089,552 gross tons, or, roughly, 73,634,328 dead-weight tons. (Lloyd's Register.)

ships, 6100 men a month. On board ships and at stations, 6035.

Duration of training, average, six weeks.

Graduates shipped out in merchant-marine crews in proportion of four to every six able seamen in the crew.

Functions

The United States Shipping Board was originally designed to promote the development of an American merchant marine and to regulate foreign and domestic shipping. Since the entry of the United States in to the war, additional legislation has given it comprehensive emergency powers to meet war problems and demands in the sphere of shipping.

Emergency Fleet Corporation

This auxiliary of the United States Shipping Board was created in April, 1917, as a corporation through the instrumentality of which the board could do whatever was necessary to add to our ship tonnage. Its power of construction is limited only by the measure of its appropriations.

The President on December 22, 1916, nominated as commissioners of the Shipping Board the following: William Denman, of California; Bernard N. Baker, of Maryland; John A. Donald, of New York; John B. White, of Missouri; and Theodore Brent, of Louisiana.

On January 19, 1917, the Senate confirmed the appointments of Messrs. Denman, Baker, White and Brent, and on January 23, 1917, confirmed the appointment of Mr. Donald.

On January 26, 1917, the President accepted the resignation of Commissioner Baker, and on January 30, 1917, the board, as so constituted, was formally organized.

On March 12, 1917, the President nominated Raymond B. Stevens, of New Hampshire, as a commissioner of the Shipping Board, vice Mr. Baker, resigned, and the appointment of Mr. Stevens was confirmed by the Senate March 15, 1917.

On July 24, 1917, the President accepted the resignation of Commissioners Denman and White, and nominated as commissioners in their stead, respectively, Edward N. Hurley, of Illinois, and Bainbridge Colby, of New York, those nominations being confirmed by the Senate on July 25, 1917, and August 8, 1917, respectively.

On July 26, 1917, the President accepted the resignation of Commissioner Brent, and on September 29, 1917, nominated to succeed him Charles R. Page, of California, who was confirmed by the

Senate on October 3, 1917.

On July 27, 1917, the board elected Commissioner Hurley as its chairman and Commissioner Stevens as its vice chairman.

On April 16, 1918, Chairman Hurley announced that as a result of the cumulative work involved in carrying forward construction in 130 widely scattered yards, a new office, that of director general, had been established by the trustees of the Emergency Fleet Corporation, that this post had been offered to Charles M. Schwab, and that he had accepted it.

As director general, Mr. Schwab has complete supervision and direction of the work of shipbuilding.

On May 9, 1918, Howard Coonley, of Boston, was appointed a vice-president of the Emergency Fleet Corporation, taking over several of the duties which had been performed by Vice-Presi-

dent Piez, in order that Mr. Piez could devote himself exclusively to matters pertaining directly to shipbuilding.

All the data given in this article was compiled by Information Bureau, United States Shipping Board, W. S. Meriwether, manager. Photographs published herewith were obtained by Pacific Marine Review from different shipyards on the Pacific Coast.

The Fulton Shipbuilding Company of Los Angeles has received contracts from the Emergency Fleet Corporation for the construction of two additional wooden ships of 3,500 tons each.

Captain Joseph J. Meany, travelling inspector of hulls for the United States Steamboat Inspection Service, and who formerly served in the Oregon territory as assistant inspector of hulls, found himself a subject of an impromptu selective draft system on his arrival the first week in October, for Captain E. S. Edwards, inspector of hulls, immediately pressed him into the work of helping out the Oregon inspectors, who are swamped with the many new carriers going into commission. Later, Assistant Inspector Moody of the San Francisco district was detailed here, and as soon as Congress acts on a bill now before its members, it is hoped that two sets of assistant inspectors will be added to the staff for permanent service. Captain J. K. Bulgar, supervising inspector, spent some time in Portland during October.

RECAPITULATION

Shipyards for the construction of seagoing ships in the United States, January, 1917, 61 shipyards (37 steel, 24 wood), having 235 ways.

Shipyards and shipways in the United States September 1, 1918 203 shipyards (77 steel, 117 wood, 2 composite, 7 concrete). These have 1,020 ways. Of 927 that are for the Emergency Fleet Corporation, 410 are steel, 400 wood, composite, and concrete, and 63 steel and 54 wood, composite, and concrete are under construction.

Seagoing ships of over 1,500 dead-weight tons each under American registry, January 1, 1917, approximately 2,750,000 dead-weight tons.

Seagoing ships of over 1,500 dead-weight tons each under American registry, September 1, 1918, 6,600,000 dead-weight tons.

Seagoing ships of over 2,500 dead-weight tons each built in United States yards for the Shipping Board from August 30, 1917, to August 31, 1918, inclusive, 1,952,675 dead-weight tons.

German and Austrian vessels commandeered, 644,713 dead-weight tons.

Seagoing vessels requisitioned and obtained by charter agreement with neutral nations, 1,695,536 dead-weight tons.

Ship workers employed in yards building for United States Shipping Board Emergency Fleet Corporation (Sept. 1.) approximately 386,000. (In July, 1916, there were approximately 50,000.)

Employees in trades allied to shipbuilding on September 1, 1918, approximately 300,000.

United States Shipping Board program of construction, 2,693 vessels, of 16,305,004 dead-weight tons.

Deliveries from American shipyards to the Shipping Board, this year, in comparison with the production of seagoing vessels of over 1,500 dead-weight tons in the United States (Bureau of Navigation figures) in the four years preceding the entrance of this country into the war were as follows:

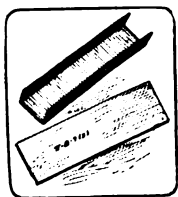
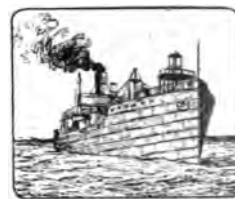
	Dead-weight tons
1918 (to Sept. 1), 277.....	1,626,052
*1916, 38	285,555
1915, 19	169,540
1914, 19	159,588
1913, 31	190,354

* Best pre-war year in the production of seagoing vessels of over 1,500 dead-weight tons in the United States.



This is the Ship That We Built

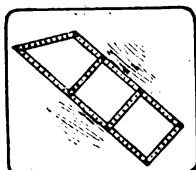
By A. J. England
In "Heave Together", House Organ, Northwest
Steel Company



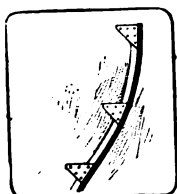
THIS is the steel—both channel and flat—that came from the mill to make up the ship that we built.



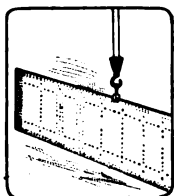
THIS is the plan which pictures the ship that was made from the steel, both channel and flat, that came from the mill to make up the ship that we built.



THIS is the mold which was made from the plan which pictures the ship that was made from the steel, both channel and flat, that came from the mill to make up the ship that we built.



THIS is the frame, both beveled and bent, which took shape from the mold which was made from the plan which pictures the ship that was made from the steel, both channel and flat, that came from the mill to make up the ship that we built.



THIS is the plate, all punched and shorn, which hangs on the frame, both beveled and bent, which took shape from the mold which was made from the plan which pictures the ship that was made from the steel, both channel and flat, that came from the mill to make up the ship that we built.



THIS is the rivet, tossed sizzling hot, that fastens the plate, all punched and shorn, which hangs on the frame, both beveled and bent, which took shape from the mold which was made from the plan which pictures the ship that was made from the steel, both channel and flat, that came from the mill to make up the ship that we built.



THIS is the man, so husky and strong, who drives the rivet, tossed sizzling hot, that fastens the plate, all punched and shorn, which hangs on the frame, both beveled and bent, which took shape from the mold which was made from the plan which pictures the ship that was made from the steel, both channel and flat, that came from the mill to make up the ship that we built.



THIS is the hull, made staunch by the man, so husky and strong, who drives the rivet, tossed sizzling hot, that fastens the plate, all punched and shorn, which hangs on the frame, both beveled and bent, which took shape from the mold which was made from the plan which pictures the ship that was made from the steel, both channel and flat, that came from the mill to make up the ship that we built.



THIS is the slip, so greasy and long, which guides the hull, made staunch by the man so husky and strong, who drives the rivet, tossed sizzling hot, that fastens the plate all punched and

shorn, which hangs on the frame, both beveled and bent, which took shape from the mold which was made from the plan which pictures the ship that was made from the steel, both channel and flat, that came from the mill to make up the ship that we built.



THIS is the soldier, all gallant and gay, who sails in the ship that slides off the slip so greasy and long, which guides the hull, made staunch by the man, so husky and strong, who drives the rivet, tossed sizzling hot, that fastens the plate, all punched and shorn, which hangs on the frame, both beveled and bent, which took shape from the mold which was made from the plan which pictures the ship that was made from the steel, both channel and flat, that came from the mill to make up the ship that we built.



THIS is the voyage (in spite of the sub) that was made by the soldier, all gallant and gay, who sails in the ship that slides off the slip, so greasy and long, which guides the hull, made staunch by the man, so husky and strong, who drives the rivet, tossed sizzling hot, which fastens the plate, all punched and shorn, which hangs on the frame, both beveled and bent, which took shape from the mold which was made from the plan which pictures the ship that was made from the steel, both channel and flat, that came from the mill to make up the ship that we built.



THIS is the Hun, all saddened and sold, who went home on the run, when the voyage was done (in spite of the sub), that was made by the soldier, all gallant and gay, who sails in the ship that glides off the slip, so greasy and long, which guides the hull made staunch by the man so husky and strong, who drives the rivet, tossed sizzling hot, which fastens the plate, all punched and shorn, which hangs on the frame, both beveled and bent, which took shape from the mold which was made from the plan which pictures the ship that was made from the steel, both channel and flat, that came from the mill to make up the ship that we built.

LIVING CONDITIONS ON THE PACIFIC COAST WITH REFERENCE TO SHIPWORKERS

Rather an interesting report has been gotten out at Washington by the Bureau of Labor Statistics, assisted by the Wage Adjustment Board of the Emergency Fleet Corporation, dealing with living conditions on the Pacific Coast, with particular reference to the shipbuilding industry, which has also brought up the housing question in various localities. When hearings were conducted in connection with the Macy Wage Adjustment Commission's labors, time was taken at each city to delve into the subject of the cost of living as well, and from the survey, data has been given out covering Portland, Seattle, Tacoma, San Francisco, Oakland and Los Angeles. Portland is held to be the most desirable city from the standpoint of living expenses of all strictly shipbuilding localities, one exception being Los Angeles. The difference between Portland and Los Angeles costs a shipbuilder about \$50 more at Portland. It is accounted for through the fact that fuel is not necessary at Los Angeles as in the cities north of it, also that less winter clothing is required. It is said that the cost of food is the same, but rents are higher in Los Angeles than in the Oregon metropolis.

The figures show that the average living costs of a ship worker at Seattle is \$1,569.10 a year; at Tacoma, it is \$1,536.02; at San Francisco, \$1,441.29, and Portland, \$1,338.41. Among the details set forth in reaching these conclusions, it is said that clothing expenditures for shipworkers' families average \$240.70 at Seattle; \$243.74 at Tacoma; \$217.62 at San Francisco, and \$200.67 at Portland. Rents at Seattle are averaged at \$221.50; at Tacoma, \$218; San Francisco, \$230.43, and Portland, \$175.17. The annual fuel and light expenses at Portland are about \$53.76, with a charge of \$73.19 at Seattle; \$68.10 at Tacoma, and \$54.95 at San Francisco. As to food costs, the average charge at Portland is \$518.65; at Seattle, \$576.38; at Tacoma, \$552.56; at San Francisco, \$578. It can be said of the entire Pacific Northwest district, as well as in California, there are no extreme winter conditions that interfere with ship construction being carried on or that necessitate the utilization of fuel so steadily and in such amounts as is the case in Eastern sections.

EXAMINATION TO BE HELD

A non-assembled examination will be held at the Bureau of Yards and Docks, Navy Department, Washington, D. C., to establish an eligible list for candidates for temporary appointments as lieutenants (junior grade), corps of civil engineers, U. S. Navy. The immediate appointments will number not less than seventeen. This examination will close at noon of November 11, 1918.

A descriptive circular giving detailed information of the requirements for this examination is ready for distribution and will be sent to interested parties upon request to the Chief of the Bureau of Yards and Docks, Navy Department, Washington, D. C.

Duration of appointments shall continue in force only until otherwise directed by the President or until Congress shall amend or repeal the authorization for the increases and not later than six months after the termination of the present war.

The Month in Tacoma

By Special Correspondent

S EVEN vessels were the offering to the Government of the Tacoma shipyards for the month of September, and of this number one was a steel ship built by the Todd Drydock & Construction Corporation yards. The Foundation yard No. 4 led off with the largest number of vessels launched and have to their credit three of their 3000-ton auxiliary type of vessels. Babare Brothers had one ship, the second launched by this company this year, while the Seaborn and Wright yards each placed one vessel in the water.

The vessels launched by the Foundation Company were the "Republique," September 9; the "Verite," September 23, and "Sauchex," September 30. The "Dungeness" was launched from the Seaborn yards September 18, and the "Bowesmont" from the Wright yards September 20. On September 28 the "Bellingham" was launched from the Todd yards and sponsored by Mrs. Neil Michael, daughter of Assistant Manager Charles Reed of the company. The "Bottineau," a Ferris type vessel, was launched from Babare Brothers yards September 30. This vessel was sponsored by Mrs. George Babare.

Trial runs of the various vessels put out by Tacoma yards were made during the month with the Seaborn yards and their Ferris type ships coming in the lead, the "China" making an average of 13 knots. Three of these vessels were placed on the Vashon Island course during the month and several turned over to the Government.

The "Wica," a Ferris type vessel, making the fourth ship turned out by the Tacoma Shipbuilding Company since this firm commenced active construction, was successfully launched the evening of October 3. This vessel was 100 per cent complete when she left the ways with the exception of machinery installation, and this will be done by the Charles C. Moore Company of San Francisco, who have the work of installing the machinery in all the vessels of this company. The "Wica" was sponsored by Miss Bernice Baker, daughter of John S. Baker, president of the Fidelity Trust Company of Tacoma. This company now has six vessels under construction for the Government.

Since the beginning of the active shipbuilding program for the Government, the Tacoma yards have turned out thirty-eight vessels of steel and wood construction. Over half of this number are now in commission.

President H. F. Alexander, of the Pacific Steamship Company, is expected from New York within a short time. President Alexander has been in the East in connection with business of the company.

The first unit of the new 305-room hotel constructed by the Todd Drydock & Construction Corporation for their men at the Tacoma plant, has been completed and is now open for business. This hotel is under the management of C. W. Harris, formerly of Chicago. The rooms of the hotel are all outside, 10 by 12 feet, fitted with hot and cold water and have single sanitary beds. Only one occupant will be allowed for each room. The hotel lobby is one of the features and is about 180 feet long by 60 wide. It is fitted with tables and other accommodations for the men who wish to write or make themselves comfortable. The big restaurant operated in conjunction with the hotel is also

open. The rates at the hotel are \$3.00 per week and meals 35 cents.

Mr. Charles N. Seaborn, of the Seaborn Shipbuilding Company, Tacoma, recently spent several days in San Francisco and the bay cities on business and pleasure.

Local docks still continue to be badly congested. The government has taken two docks for use by the quartermaster department and these are filled to capacity. The Milwaukee docks are full and much freight is held in the yards of the railway company awaiting cars or steamers.

Tea imports through this district and passed upon by United States Examiner L. G. Fenton at Tacoma amounted to 6,225,000 pounds. The first few days in October showed nearly this amount, which presages a big business for this month.

Edward W. Heath, formerly superintendent of the Tacoma Shipyards, has been appointed superintendent of the Sloan yards at Olympia. Mr. Heath is one of the old-time wood-ship builders of this State and has built some of the finest vessels plying out of Puget Sound.

Tacoma has received two grain cargoes from Australia. In both instances the wheat came through in very good condition. The last cargo, which came in a motor ship, but was sailed all the way, was 113 days en route and did not show the least damage. Flour cargoes are moving from Tacoma now fairly regularly.

Sponsored by Mrs. H. H. Williams, wife of the French inspector at the Foundation Shipyards No. 4, the auxiliary schooner "Egalite" was launched the evening of October 7. The launch of the "Egalite" was a success in every particular. This makes the sixteenth vessel placed in the water by the Foundation yards in Tacoma since May, when the active construction was commenced at these yards.

Export and import business from Tacoma was doubled for the month of July over June, according to the report of Collector of Customs, Roscoe M. Drumheller, of this district. Exports were valued at \$9,461,507 and imports \$5,703,561. Collections totaled \$100,944.33.

Coastwise lumber business remains brisk and there are prospects for considerable off-shore business within the next few weeks. There is one schooner in port now loading for South America. Wheat for export is now moving rapidly through Tacoma to various sections. The flour movement is good and marks a big resumption in the marine business at this port.

Sydney Baker, of the Baker Dock Company, Tacoma, died at the family home October 7 after a short illness. The death of Mr. Baker came as a distinct shock to his many friends at Tacoma and Seattle. Mr. Baker at the time of his death was about 50 years of age. He was a native of Kingston, Ontario, and came to the Sound twenty years ago. Mr. Baker was with the Pacific Steamship Company at Seattle for a number of years and came to Tacoma with the old Eureka Dock Company as representative of the American-Hawaiian and other lines using the Eureka dock. When these services were discontinued on account of the war, he secured a part of the Balfour dock and went into business on his own account. Mr. Baker was universally respected and admired by everyone who enjoyed his acquaintance.

Los Angeles Harbor

By Special Correspondent

THE first launching from the newest shipyard in Southern California, the Southwestern Shipbuilding Company, took place on October 12, when the steamer "West Carnifax" slid from the ways into the main channel of the harbor. With the launching of the "West Halifax," the Southwestern yard took its place with the three other yards here delivering steamers to the Emergency Fleet Corporation.

Officers of the company recently announced that the yard was preparing to utilize the entire area of their lease. The company has control of the property formerly controlled by the Pacific Wharf and Storage Warehouse Company, but at present does not use the entire area of fifty acres.

Just what plans are being contemplated by the company, its officers at present do not wish to divulge, but in view of the contracts and orders given it for additional steamers during the recent visit of Director General Charles M. Schwab, it is believed that more ways will be installed until the yard is one of the largest on the coast. The Southwestern Shipbuilding Company began operations with contracts for the delivery of eight steamers of the 9400 ton class. At present it has orders for steamers that reach an additional valuation of \$20,000,000.

Dredging operations to clear the channel immediately in front of the launching ways of the yard have been completed. With the installation of more ways, these operations will be extended.

The Standard Oil Company, through J. L. Quinn, salesmanager of the company for the harbor, has requested the Harbor Commission to dredge shallow places in the way of approach to the Standard Oil Company's dock in the turning basin. Mr. Quinn cited the fact that the company was now operating thirteen steamers from San Pedro and would soon operate eleven additional vessels of large tonnage. He has asked that dredging be of sufficient depth to accommodate steamers of 30-foot draft.

Co-incident with the request of Mr. Quinn of the Standard Oil Company, there came a similar request from E. W. Clark of the Union Oil Company, asking that dredging operations be commenced in the west basin and inner harbor. Mr. Clark cited that the Union Oil Company was installing a huge refinery fronting on the west basin and that there were many shallows in this basin. He wishes a survey to be followed by dredging operations to enable large tankers of this company to approach the docks to be built in the inner harbor.

Dredging operations have been commenced in the west basin to accommodate the proposed 10,000-ton dry dock to be constructed by the Los Angeles Shipbuilding and Drydock Company. The United States Engineer's office recently held a hearing to learn if there were any protests against the proposed dredging and with the close of the hearing there was an end to the last formality connected with the actual beginning of the work. The west basin will be dredged to a depth of fifty feet. The dry dock will cost approximately \$1,000,000 and will require many months to construct. The dredging operations alone will take some four or five months' time. The site for the dry dock was determined upon on the recent visit of Mr. John H. Rosseter and was selected after he had been

assured that there were no silt deposits in the west basin. Naval officers stationed here favored the west basin as the site for the dock, owing to its being better protected from possible attack from the sea than any other place in the harbor.

Mr. Clarence Matson, traffic manager of the Los Angeles Harbor Commission, is gathering data to be submitted to the proper authorities in Washington to further the project of establishing coal bunkers in the outer harbor. The need for these bunkers has been apparent to the Harbor Commission for many months, and with the increase in traffic at San Pedro involved in the construction of steamers for the Emergency Fleet Corporation, active efforts to secure the establishment of the bunkers are now being made. The outer harbor site was suggested by members of the Harbor Commission, owing to the presence of a line of rails leading to the top of the bluffs from which bunkers could be constructed at sufficient elevation without it being necessary to construct a long, graded approach trestle. There is no coal pile south of San Francisco until the one operated by the Government in lower California waters is reached.

In the annual report Traffic Manager Clarence Matson rendered to the Harbor Commission, he has asked for an expenditure of \$4,500,000 for the completion of various harbor improvements outlined in the beginning of the local harbor improvement campaign in 1909. Among the improvements recommended is the formation of an organization to maintain and operate steamers plying to foreign ports, construction of more wharves and sheds, more dredging, the establishment of coal bunkers and general preparation to meet the great trade expected with the closing of the war.

He has suggested that the opening of the Alaskan coal fields and the construction of bunkers here would bring smelters to smelt iron ore to be secured readily in the San Bernardino mountains.

Sending a steel hull down the ways that is 98 per cent completed, whereas the custom is usually to start them for the water when not more than 75 per cent along, was an accomplishment of the Albina Engine & Machine Works, October 18, the vessel being the Caddopeck, the eighth of the fleet launched there. She is of the 3800-ton type and, with the exception of the boilers, the hull, main and auxiliary machinery and complete fitting-out details, will represent the work of the yard. Mrs. George Rodgers, whose husband is superintendent for the plant, was sponsor, and the vessel slid into the Willamette River at 4:30 p. m. There were eleven others of the size to follow under present contracts and more are expected as a result of a visit to the Philadelphia headquarters of the Emergency Fleet Corporation of William Cornfoot, president of the corporation. The Caddopeck was floated with all pumps, windlasses, winches and such gear in place and only the main engine and boilers remained to be installed, and then the joiner-work completed. The boilers for the Albina Engine & Machine Works are being turned out by the Willamette Iron & Steel Works.

The steamer Cadaretta, launched at the Albina yard September 2, went on her official trial trip October 25 and was accepted the following

The Free Port Question

MR. FREDERIC J. HASKIN, in an article on this important subject, appearing in the daily press, says that after a complete investigation of this question, during which the testimony of hundreds of American business men was heard, that the United States Tariff Commission has reached the conclusion that the American Nation as a whole wants free ports. A report embodying a recommendation to this effect will shortly be submitted to Congress, where a bill providing for the establishment of free ports has already been introduced. In the meantime, many people, confused by vague definitions, are demanding to know what a free port is.

A free port is not, as some mistaken individuals have claimed, an institution that will enable us to buy food as cheaply as they buy it in Europe, or that will permit us to import French tapestries and Brazilian diamonds free of duty. It will not affect most of us at all, except indirectly through the promotion of our national prosperity, and we will be kept out of its precincts by a strong armed guard. A free port is merely a barred zone adjacent to a port, where goods may be landed without any customs formalities; stored for indefinite intervals, and re-exported. Between it and the mainland are the regular custom authorities who place the usual taxes on all goods being shipped into the interior.

In other words, a man may bring a shipload of Panama hats into a free port; put American hatbands on them, and ship them to Great Britain without paying a cent of duty. But the same hats consigned to a firm in the United States would have to pass through the hands of the customs officials and pay a tax.

Chief Object of Free Port

The chief object of the free port, therefore, is to facilitate foreign trade. The end of the war will see this country in the possession of a large merchant marine, and with machinery for production out of all proportion to the demand of our domestic markets. An outlet for the surplus must be found in the markets of Europe, where materials will be scarce for years to come. At least, so argue our economists, who urge that the nation begin at once preparations for this large volume of foreign trade that is certain to follow the war.

One of the first obstacles to be eliminated, if we are to build up a large foreign commerce, is our clumsy customs collection machinery. Something must be done to speed up the unloading and re-loading of cargoes. Under present conditions, for instance, every vessel arriving at the port of New York must secure a preliminary permit before it can dock and unload its goods. Furthermore, this permit must be in a ship's possession twenty-four hours before docking. While a preliminary permit may be taken out by the ship's agent in advance of its arrival, in many instances this is not done, and the usual twenty-four-hour delay ensues.

Then the vessel is allowed to discharge its cargo on the pier, but here, too, it is held up until samples of each shipment may be examined by the customs authorities and sent to the customs appraisers. A great deal of the merchandise must be weighed while on the pier, and a mass of red tape makes the loading of lighters for delivery to other

piers a tremendous task. The result is pier congestion. Cargoes become piled up; other ships are delayed in docking for want of room to place their goods, and the piers are centers of noisy confusion, with importers, captains, ships' agents and customs officials rushing madly around, losing their tempers and important papers. A representative of one large steamship company declares that its ships are often delayed at the piers for four or five days at a stretch.

If goods are to be marketed immediately, the duties are paid as quickly as possible and permission to remove them from the piers secured. If they are not to be marketed immediately, they are usually placed in bonded warehouses, so that the duties do not have to be paid at once. Certain fees are charged by warehouses, and innumerable papers must be filled out. The sale of goods stored in these bonded warehouses is extremely difficult. Purchasers can examine it only under the careful scrutiny of the customs officers and usually under adverse conditions, in a place where the light is dim, where the articles are hard to get at, and where the background is anything but lovely. Under these circumstances, the most expensive luxuries sometimes appear dingy, and the mildest customers obdurate.

Use of Drawback System

In cases where firms import certain European materials and combine them with American materials for re-shipment, as in the case of the Panama hats and American hatbands, they usually use the drawback system. In other words, they pay duty on the goods, and when they reship it the government returns them 99 per cent of their payment, known as a "draw-back." This system has many disadvantages, also, for there is many a slip betwixt the manufacturer and the drawback. He must have all the papers incident to the first payment of duty, and if merchandise has come in on different ships in different consignments, these amount to a small volume. Every bill of goods must be located on the customs records and identified before the drawback is authorized.

These are only some of the difficulties enumerated by business men as reasons for the establishment of free ports. Separated from the rest of the port by natural or artificial boundaries, a free port has its own wharves, warehouses, factories, and all the latest mechanical equipment for the expeditious handling of cargoes. Ships can dock there without a permit, preliminary or otherwise; land their goods without delay, and forget that there is such an unmitigated nuisance as a customs regulation. Firms with factories within the free port can unload their goods directly from vessel to showroom, arrange it for sale in their own private salesrooms, or reship it whenever they get ready.

The worst objection to the free port is its German origin, but as one noted commercial authority points out, "At a time when the United States is looking to foreign markets as an outlet to her future industry, German methods are especially worth while studying, since Germany in the space of thirty or forty years developed from an agricultural nation to a commercial nation of first rank." Before the war, Hamburg was the great free port of the world, and occupied an important place in Ger-

many's commercial expansion—a place created largely by accident.

Before the German federation in 1871, both Hamburg and Bremen were independent cities and had occupied that status ever since the fourteenth century, when various independent cities banded themselves into the Hanseatic League and kept their gates open to trade without duties, despite the opposition of petty nobles. When they came into the German empire, it was with the understanding that they would remain outside the German customs union, but later they agreed to a plan proposed by Bismarck whereby the cities should enter the customs union and their harbors be left free. So began the free port as it is today.

Hamburg soon began to attract attention by its success as a free port, and Denmark built a free

port at Copenhagen in order to meet the competition. The other two great commercial cities in this part of the globe, Antwerp and Rotterdam, did not follow suit, nor did the other two great commercial nations, England and France, establish free ports. Free ports were impractical for them, because England was a free trade nation, and Belgium and Holland were semi-free trade nations, while France was largely a manufacturer of luxuries which are less expensive to handle than bulky staples. Germany, on the other hand, had a high scale of tariff such as that which prevails here in the United States. Her home industries were protected by prohibitive duties and interminable customs regulations, but she encouraged and promoted her foreign trade through the medium of her free ports.

Foreign Trade Must Be Sought

THE foreign trade department of the San Francisco Chamber of Commerce is making an earnest appeal to the business men of San Francisco to get ready with preparations for "After the War Commerce," so as to provide the tonnage necessary for the vast American merchant fleet now in course of construction.

When we consider that during 1914-1915 the total steam gross tonnage of the United States, excluding that employed on the Great Lakes, was only 2,890,315 gross tons and that the prospective American gross tonnage in 1921 is estimated at 25,000,000 deadweight tons, equal to about 17,000,000 gross tons, the need for careful study as to how we are going to successfully maintain our merchant marine is very apparent.

Chairman Hurley in a recent letter to the foreign trade department of the San Francisco Chamber of Commerce states that the Shipping Board will provide fast American passenger and cargo liners which will run regularly to every port in Latin America, the Orient, Africa and Australia and will carry passengers and cargo at rates corresponding to our railroad rates—the cheapest in the world, and that it is up to the merchants to provide cargoes for these ships. If American business men do not supply the cargo, these American ships will either have to serve other nations in competition with American firms, be tied up or sold to foreigners. For years the business men of America have been clamoring for American ships. They are now to be provided, and it rests with the business men of this country to keep them going and to restore the American flag on all the oceans and seas of the world. San Francisco has never been called upon by the nation and failed to respond in even greater measure than this appeal.

It has been estimated that before the war the United States exported about five per cent of its manufactures. This will not be one-tenth enough to fill these ships. There are thousands of manufacturing plants now producing war materials and supplies. These will be turned into producers of articles of peace thereby enabling them to maintain the millions of skilled workmen on the payroll. To produce these articles of peace is not enough, markets must be found for them in foreign lands. This being accomplished, it will be

found necessary to procure raw materials for manufacturing and to provide return cargoes for these ships. The spirit of "foreign commerce" is in the air throughout the land and sporadic efforts are being made to form business connections throughout the world. Some firms are sending their best men to investigate conditions and possibilities with a view to arranging representation, some are writing letters to foreign firms about whom they know nothing in regard to having them act as agents. The mails are an excellent medium to carry on business, but a poor one to arrange for representation. There are just so many reliable firms in foreign countries who would be suitable to represent American houses. There are not enough to go around and the American business men first in the field are the ones who will reap the benefits. Those who put off until too late to provide for proper representation will probably lead a precarious existence after the war if, indeed, they are able to compete at all with those who are properly protected. Every nation in Europe will be after this foreign commerce and after representation. They have been investigating and making arrangements while we have been waiting. Now while European business men are unable to supply the foreign markets and while our own war regulations impose severe restrictions upon our foreign trade is the time to prepare. The opportunity of centuries is here knocking at the door and opportunity comes but once and never returns. The foreign trade department not only invites suggestions and requests for assistance, it urges you to make them. Is it not better to "grasp the Opportunity" now instead of waiting until too late and then reflecting "It might have been?"

At the urgent request of the United States Quartermaster's Department, Chief Engineer George F. Nicholson, of the Port of Seattle Commission, went to Washington to participate in the conferences over the new Harbor Island pier to be built by the Government for war purposes, and later to be taken over by the Port of Seattle. It is the desire of the Government to construct this pier to conform, for the most part, with the present and proposed structures built or to be built by the port.

Portland is Preparing

By W. D. B. Dodson

Executive Secretary, Portland Chamber of Commerce

PORTLAND'S answer to the appeal of Edward N. Hurley, chairman of the United States Shipping Board, for preparation in the handling of the greatest American merchant marine that ever sailed the seas, is to take the following form:

1. Organization of an operating and chartering company, with Portland capital and managed by a competent steamship man.

2. A dock construction project that will involve:

- (a) The finishing of what is known as the St. Johns Terminal, accommodating eleven vessels at this unit at one time, and the probable extension of the bulk handling elevator to a 2,000,000 bushel capacity.

- (b) The acquisition of extensive foreshore in the harbor where a row of piers on either side of the river may be constructed.

3. Provision for dredging out what is known as Swan Island, in the lower main harbor, and using the debris to fill extensive overflowed lands adjacent, which will be used for dock construction and industrial sites.

4. Opening the harbor from end to end for any draft of vessels that may visit the port.

5. The construction of two additional pipe line dredges that may be added to the local battery for the expeditious clearing and permanent improvement of the channel of the Columbia river between Astoria and Portland, where such work is not fully performed by the Federal Government, so as to guarantee the free and unobstructed movement of vessels up and down the Columbia river.

6. Ample provision for the towage and pilotage service at the mouth of the Columbia river, guaranteeing movement of vessels in and out without delay.

7. The construction of a modern new drydock of at least 12,000 ton lifting capacity.

8. Increased coal storage, bunkering facilities and loading facilities in the stream.

9. Ample machine shop repair facilities on the shore at the new drydock and on a floating barge for the work.

The total cost of this work has not been fully estimated. For its consummation in all details, except the building of the piers on the land to be acquired and perhaps making a start on this pier construction, it is estimated that about \$12,000,000 or \$13,000,000 will be required.

As the first step in the program, the Commission of Public Docks is going before the electors in November asking for a \$5,000,000 bond issue to begin the dock construction program. At a later date an effort will be made to consolidate the Port of Portland and the Dock Commission into one body, having charge of dock construction operations and port and channel dredging. Following the consummation of this movement the additional authority for other phases of the work stated is to be provided, including issuance of bonds.

In Portland the sentiment is now stronger for the development of extensive port facilities than

at any other time in the history of the city. During the period of the war there has been a most discouraging condition experienced by Portland in shipping. The community, due to a fortuitous combination of circumstances, has seen its shipping operations sink to a very low ebb. In view of the fact that the Federal Government now owns the ships being built under the American flag, and will probably operate the same directly or charter them to private companies for operation in peace times, Portland realizes that its main expenditure now may be confined to port improvement work. Unless all signs fail the strongest possible support of the voters will be given to any thoughtful plan that is outlined for making Portland one of the great ports of the Pacific.

Portland and Oregon's contribution to the Government shipping needs in the way of new construction has been one of the bright spots of the Emergency Fleet Corporation's program. A little less than three years ago there was barely any shipbuilding in the harbor of Portland or the State. In that time nineteen yards have been built and ways have been driven for the construction of ninety-four ships simultaneously. Of the companies operating, five are building steel ships, the remainder, wood. In the wood construction department the most rapid work recorded in any district of the Emergency Fleet Corporation has been witnessed. Well above 100 ships have been launched since the heavy construction began and nearly all of the ways are loaded with craft now under course of construction which will be launched at an exceedingly rapid pace if wood construction continues as a part of the Government building program.

In the steel shipbuilding department above thirty ships have been launched and the steel shipbuilders are just reaching their best stride. Good records have been made in the work and had it not been for delay in receiving materials there would have been a very material increase over the number of launchings and deliveries that have taken place to date.

Assurance is given by the head of the Shipping Board that the State of Oregon, having risen to the national need in such patriotic spirit, and having such patent needs for extensive tonnage in the handling of raw materials outbound and commerce inbound, will receive allotments of ships when the war crisis passes, to take care of all its problems. The effect of this situation should be the presence of the largest fleet of ships operating to and from our port ever witnessed in the history of the State. Not only will the foreign ships that formerly came for wheat, our and lumber be present after foreign tonnage conditions are normal, but the State will have through the Emergency Fleet Corporation, the call on American charters that will greatly extend its carrying trade and should make the sea-borne commerce of the port jump beyond all records ever known in the past.

In figuring upon the possible needs of ships here, it is recited that Portland in past years put upon the water from five to six hundred thousand

tons of wheat and flour annually. Portland and the Columbia river also have put upon the water, several hundred million feet of lumber each year.

Owing to changed conditions in channel and improved handling facilities for cereals, Portland people are confident they will gain a very marked increase in their percentage of the wheat and flour from the Northwest put upon the water. The fact that Portland is about forty-five miles nearer the center of the wheat producing territory of the Northwest, which raises about 63,000,000 bushels a year, and owing to the further fact that the route of hauling this wheat from producing point to tidewater is all down-grade to Portland and over a high mountain range to Puget Sound, confidence is felt that the fundamental principle of economy advocated by the railroad administration will result in bringing a growing percentage of the wheat of the Inland Empire to this point rather than to its competitor.

In the lumber trade, Portland is looking forward to the greatest development that has ever been witnessed by any community of the United States in the handling of soft woods. There is in the territory tributary to the Columbia river approximately 550,000,000,000 feet of commercial standing timber. Practically all of this where it seeks a market via deep sea routes must pass through the Columbia gateway. Making due allowance for the quantity of lumber that may be handled under an increased manufacturing program by the rail-

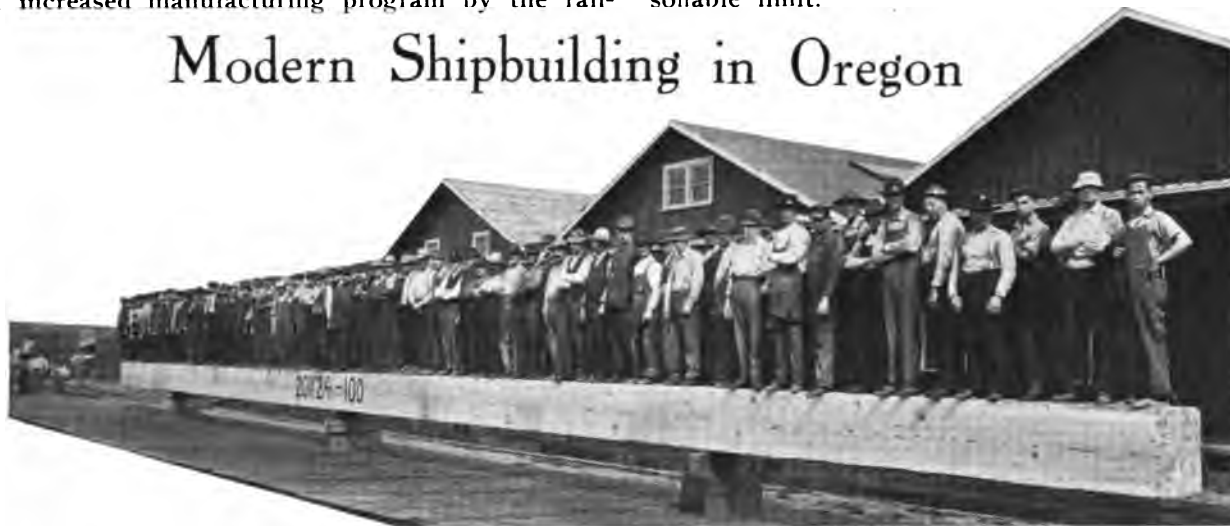
road lines for distribution between the Cascade Mountains and the Mississippi river, experts yet figure that more than 300 ships would be needed to handle that portion of the trade that must go by water routes.

That this lumber will be manufactured in the not distant future is a certainty, for this is the greatest stand of soft woods left in the world. Hundreds of millions of dollars are invested in the forest and this investment must realize a profit. Decline in production of yellow pine in the Southern States is a certainty within five years. Enormous demands for lumber during the reconstruction days following the European war are also a certainty.

Lumber for Europe to meet its enormous post-war requirements will probably move in heavy quantities until the influence of yellow pine in the soft wood markets of the world has commenced to decline. Figuring thus, lumbermen in this region believe that they are due for the greatest sustained lumber manufacturing era that has ever been witnessed in any part of the United States and a fleet of ships with extensive tidewater handling facilities will be required to market the same.

This condition as a whole is appreciated by the people of the community and it seems certain that the vote of electors on all bond issues for extensive port improvement and construction work will be in the affirmative up to almost any reasonable limit.

Modern Shipbuilding in Oregon



Stick of timber for use as rider keelson in 4000-ton vessel

Construction of wooden steamers to augment the gigantic Merchant Marine Fleet the Government is assembling through the Emergency Fleet Corporation has developed many outstanding features in the Northwest, because of the proximity of shipbuilding establishments to the unlimited timber supply of that territory.

The stick of timber shown in the above photograph is intended as a rider keelson for a 4000-ton type vessel that was started during the latter part of September. It is 20 inches by 24 inches and 100 feet long. Before the stick left the mill on its way to the yard, the men proposed having their pictures taken standing on it and there are 78 of them, and more men could have been accommodated. Even longer and larger timbers are produced to build the vessels of the wooden fleet. For example, the keels measure 24 inches and only three pieces are required for a complete keel of a

vessel more than 300 feet in length and only two scarphs are necessary in fastening these big timbers. There are also deck stringers which run more than 100 feet in length, some of them being 112 feet long and 14 inches by 20 inches. The stern posts often measure 34 inches by 36 inches and 34 feet long, while strong backs are 18 inches by 28 inches and 52 feet in length, and stem pieces measure 22 inches by 40 inches and 54 feet in length. There are extremely long lengths for the inner and outer skin—that is, the ceiling and planking.

Wooden vessels are far from being a new departure in the Pacific Northwest, as they have figured in the coastwise and deep water trade for many years, but the revival in shipbuilding that arose to meet the demand for war tonnage, has shown what wonderful material can be drawn from the forests of Oregon and Washington.



Mr. Robert L. Hague, head of the Department of Design, Inspection, Survey and Repairs of the United States Shipping Board

FRIENDS BID MR. HAGUE ADIEU

News of the appointment of Mr. Robert L. Hague as head of the Department of Design, Inspection, Survey and Repairs of the United States Shipping Board, under direct charge of Mr. John H. Rosseter, Director General of Operation, was received in San Francisco with deep satisfaction by ship owners and builders alike, for all recognize Mr. Hague's ability and his many talents that peculiarly fit him for this important appointment.

As an expression of gratification over Mr. Hague's well merited promotion to such an important post in the shipping life of this country and in order to afford his many friends in San Francisco an opportunity to bid him good-bye and good luck, an enjoyable dinner party was arranged by Mr. O. B. Kibele, Mr. J. J. Tynan, Mr. Dan E. Ford and Mr. William Muir, at the Palace hotel on the evening preceding Mr. Hague's departure for the East. The sixty-six guests present at the dinner included those prominent in both the shipbuilding and ship operating fields in the San Francisco Bay region and the gathering was of more than usual interest. Mr. William Muir presided as toastmaster and interesting talks were made by Mayor Rolph, Messrs. Jos. J. Tynan, John Scott, William Healy, Captain Pillsbury, Frank H. Evers, William Chisholm, A. S. Gunn, Geo. Armes, J. C. Rohlf, W. W. Johnson, J. S. Hines, Thos. Mirk and others. Great tribute was paid Mr. Hague and he was congratulated by all on his splendid appointment.

The list of guests follows: Mr. and Mrs. R. L. Hague, Mr. and Mrs. J. J. Tynan, Mr. William Muir, Mr. Jos. Moore, Mr. John Scott, Mr. and Mrs. A. S. Gunn, Mr. and Mrs. A. Foster, Mr. and Mrs. J. C. Rohlf, Mr. and Mrs. C. H. Robertson, Mayor and Mrs. James Rolph, Mr. and Mrs. W. J. Owens, Mr. and Mrs. F. H. Evers, Mr. and Mrs. S. C. Symon, Mr. Geo. Armes, Mr. and Mrs. A. Moncaster, Mr. and Mrs. William Chisholm, Mr. and Mrs. Wm. Healy, Mr. and Mrs. George Silliman, Mr. and Mrs. James Botts, Mr. and Mrs. M. P. Geirrine, Mr. and Mrs. J. H. Rinder, Mr. O. B. Kibele, Mr. Dan Hanlon, Mr. Stanley McMillian, Mr. Thos. Hayes, Mr. W. R. Kennedy, Mr. Daulton Mann, Captain and Mrs. A. H. Pillsbury, Mr. James Armsby, Mr. Dan E. Ford, Thos. Crowley, Mr. A. F. Frey, Mr. Thos. Mirk, Mr. and Mrs. James Hines, Mr. Davis, Mr. and Mrs. W. W. Johnson, Mr. Becker, Mr. and Mrs. H. G. Peak, Mr. and Mrs. Frank Neitzel, and Captain Bridgett.

PARR TERMINAL COMPANY

The development work of the Parr Terminal Company on the Oakland waterfront site is progressing nicely. Contract for piling has been let, work to commence at once. Work is under way on the track system for the yard. Over two miles of track will be installed. A complete switching system will be installed and the main warehouse flanked by four tracks. Contract has just been closed with the Brown Hoisting Machinery Company for a fifteen-ton locomotive crane. Seven acres have been leased to the American Manganese Steel Company, who will erect and operate a modern steel plant. Their contract calls for \$300,000 expenditure within six months. Mr. Ortman, president of the steel company, states that

their investment in this plant will be nearly \$600,000 before that time.

Five acres have been leased to the National Pole Company, who will supply all poles for the Bell Telephone and Western Union systems.

In addition to these leases, two big Eastern corporations are now bidding for locations at this terminal.

ANNUAL MEETING OF SOCIETY OF NAVAL ARCHITECTS AND MARINE ENGINEERS TO BE HELD IN PHILADELPHIA DURING NOVEMBER

THE Society of Naval Architects and Marine Engineers will hold their twenty-sixth general meeting at Witherspoon Hall, Philadelphia, on November 14th and 15th, 1918. There will be a banquet in the grand ball room of the Bellevue-Stratford Hotel, at 7 p. m., Friday, November 15th, to which all members and their guests are cordially invited. Tickets are \$4.00 each.

The Council of the Society will meet at 3 p. m., Wednesday, November 13th, in the office of the secretary-treasurer, Mr. Daniel H. Cox, U. S. Shipping Board Building, 140 North Broad Street, Philadelphia, Pa.

The list of papers which are to be read at the meeting are as follows:

"Revival of Wooden Shipbuilding as a War Emergency," by Mr. Carlos deZafro, associate member.

"Floating Drydocks," by Mr. Charles N. Crowell, member.

"On Vibrations of Beams of Variable Cross Section," by Mr. N. W. Akimoff, visitor.

"Notes on Progress in Turbine Ship Propulsion," by Mr. Francis Hodgkinson, visitor.

"Structural Steel Standardized Cargo Vessels," by Mr. Henry R. Sutphen, member.

"Notes on Launching," by Mr. William Gatewood, member.

"Side Launching," by Mr. Frank E. Kirby, honorary vice-president, and Mr. Edward Hopkins, member.

"Experiments Upon Simplified Forms," by Professor H. C. Sadler, member of council.

"Standardization of Ships," by Mr. A. J. C. Robertson, member.

"Variation of Shaft Horsepower, Propeller Revolutions and Propulsive Co-efficient with Longitudinal Position of the Parallel Middle Body in a Single Screw Cargo Ship," by Naval Constructor William McEntee, U. S. N., member.

"Recent Developments in Shipyard Plants," by Naval Constructor Sidney M. Henry, U. S. N., member.

"Concrete Ships," by Mr. R. J. Wig, visitor.

"The Application of Electric Welding to Ship Construction," by Mr. H. Jasper Cox, member.

"Hog Island—The Greatest Shipyard in the World," by Mr. W. H. Blood, Jr., visitor.

Most recent of the foreign nations to look Portlandward is Italy, and Captain G. Gomo di S. Stefano, commander of Mesurito, of the Royal Italian Navy, official representative of that government, spent a few days in Portland during October, inquiring into shipping and harbor conditions. His government contemplates the operation of a fleet from Italy to the Pacific Coast via the Suez Canal.

Columbia Iron and Welding Works, Inc.

WHEN an old reliable and well-established business enterprise makes announcement of large plans for expansion of their plant, such an announcement carries great significance to that portion of the business world who are their actual or prospective patrons.

In recent months there has been witnessed what might be termed a mushroom-like growth of industries in all lines affected by war conditions. These new plants and enterprises, or a majority of them, have been established in direct response to the demand of our Government shipbuilding program and they are patriotically doing their part—many of them turning out splendid jobs on the most difficult class of work.

We all know, though, that the average business man, who is always to some degree conservative, and rightly so, maintains a decided preference for the old and thoroughly tried concerns operated by men who "knew how" before the war, and know how now better than ever before.

For this reason ship operators and ship builders of the entire Columbia River district, numbers of whom are satisfied patrons of the Columbia Iron and Welding Works, Inc., of Astoria, will be interested to learn that this concern is planning extensive enlargements and improvements to their plant. Additional ground floor space on the west side of the present plant has already been acquired, material has been ordered and contracts let for the work and equipment. As an illustration of the extent of the planned enlargements, it should be mentioned that while the company is now operating three lathes, so selected in size, however, as

to enable them to care for practically all sizes of machine work, the new shop will contain in its equipment twenty lathes of latest design. The forge shop will also be increased in size from three to six fires, and entire equipment increased in like or greater proportion.

This plant is one of the oldest in its line of work in the Columbia River district, and for the past three years has been under the efficient management of Mr. William Silvo, managing engineer. They are now operating a complete marine repair and equipment shop, and, it should be added, are the only boiler makers in their immediate vicinity.

The government work assigned to them is in itself evidence of the position they occupy in their own community, and in shipbuilding circles generally. All the machine shop and boiler work of the Rodgers Shipbuilding Company, together with a large part of the same class of work for the McEachern Yard and the Wilson Shipbuilding Company, is cared for at this plant. This, however, is not all of the Government work handled by them, as they are also taking care of the same class of work for the large Government spruce and lumber camps on the Columbia peninsula.

Mr. Silvo expresses great faith in the future of Astoria, particularly on account of its favorable location for ship repair work, and is backing his faith in the port's development in the most substantial manner. In the completion of his company's planned enlargements, the port will have a substantial addition to its facilities and one that carries with it the additional merit of a well-earned and valuable reputation.

Oil Engines and the Foreign Trade

ON October second, Mr. J. H. Hansen, president of the Skandia Pacific Oil Engine Company, delivered a very interesting and instructive address before the San Francisco Foreign Trade Club on the subject, "Oil Engines and the Foreign Trade." We are glad to note in this connection that the Emergency Fleet Corporation has recently authorized the construction of thirty-six 7100-ton freighters of this type and have ordered for the same sixty-two reversible Diesel residuary oil engines of 750-shaft horsepower each. We congratulate Mr. Hansen on having secured for his organization the contracts for twenty of these engines.

The following extracts from Mr. Hansen's lecture will interest all thoughtful shipowners:

"During these times, when next to the winning of the war, shipbuilding and the development of a foreign trade are foremost in the minds of everyone throughout the entire world, be it nations at war or neutrals, the time has come for this country not only to consider the acquirement of a large merchant marine, but also the economical operation of this merchant marine in competition with other nations.

"There are two things which are of the utmost importance in this connection. First, is to have laws that will enable us to operate our ships on a competitive basis. Second, is to build and equip the ships in such a manner that their efficiency will be equal to the best that is produced. It is

in this connection that the crude oil engine will be an important factor and must be given serious consideration if we are also to maintain this merchant marine after the war, when keener competition will set in.

"The crude oil engine has proven to be far beyond its experimental stages and numerous large ships have been operating successfully with these engines in Europe during the last eight years. All of these ships have amply demonstrated the superiority in economic operation and have proven to be just as reliable as any steamer.

"There are today more than 700 larger ships operating with Diesel engines, besides thousands of smaller crafts that also operate with crude oil engines. Some of the advantages of these engines for marine purposes are as follows:

"1. The space occupied is less than that required by the steam engine and boilers. Also, the weight is less, which consequently means greater space in the ship available for cargo.

"2. The greater distance that a ship equipped with oil engines can travel as compared with the steam engine on account of less fuel consumed. The average steam engine consumes $1\frac{1}{4}$ to $1\frac{1}{2}$ pounds of fuel oil per indicated horsepower, whereas the crude oil engine only consumes $\frac{3}{10}$ to $\frac{45}{100}$ of a pound per indicated horsepower hour; in other words, only one-third to one-fourth of what the steam engine requires.

"3. The amount of attention required on a mo-



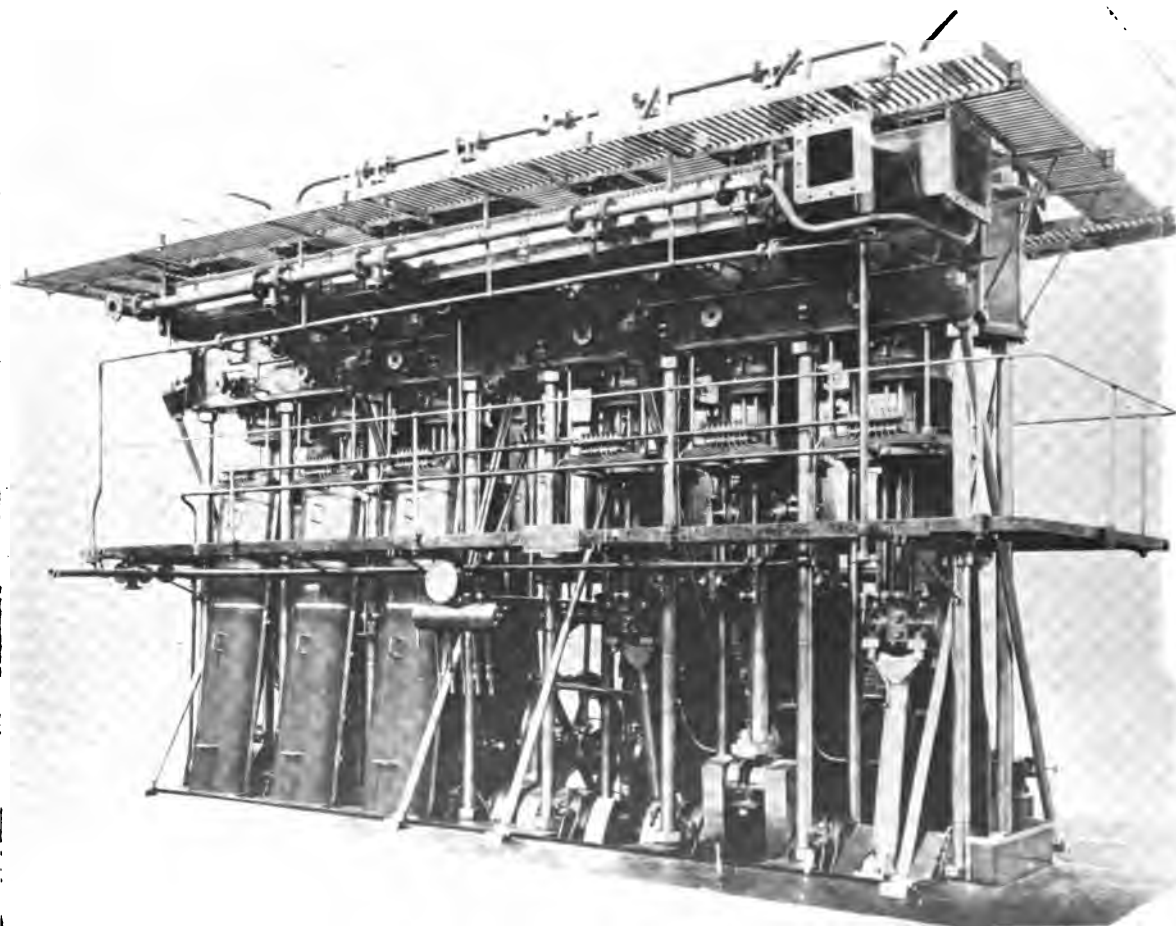
M. S. "Sebastian", which has a deadweight capacity of 4500 tons and a cargo capacity of 4100 tons. The engines, which are of the Werkspoor four-cycle type, develop 2200 I. H. P. On her last voyage to New York, both her engines made a sixteen days' run without a single stop in very heavy weather, averaging 8.8 knots, although three of her assistant engineers had never been to sea in a motorship before.

torship is less, the stokers and coal trimmers necessary with the steam engine ships being entirely eliminated.

"4. The quick starting of the engine, which can be accomplished at a moment's notice.

"5. The elimination of standby losses—that is,

as soon as the engines are stopped the fuel consumption ceases. With the steam engine ships it takes from six to twenty-four hours to get up the steam, and after the engines are stopped considerable heat is wasted due to the cooling of the water in the boilers."



The Werkspoor Diesel which has given such excellent results



Scenes at the G. M. Standifer Construction Corporation. The steel storage yard is shown in the upper photograph, the big double end punch is pictured in the center, and the five building ways and tower derricks are given in the lower photograph.

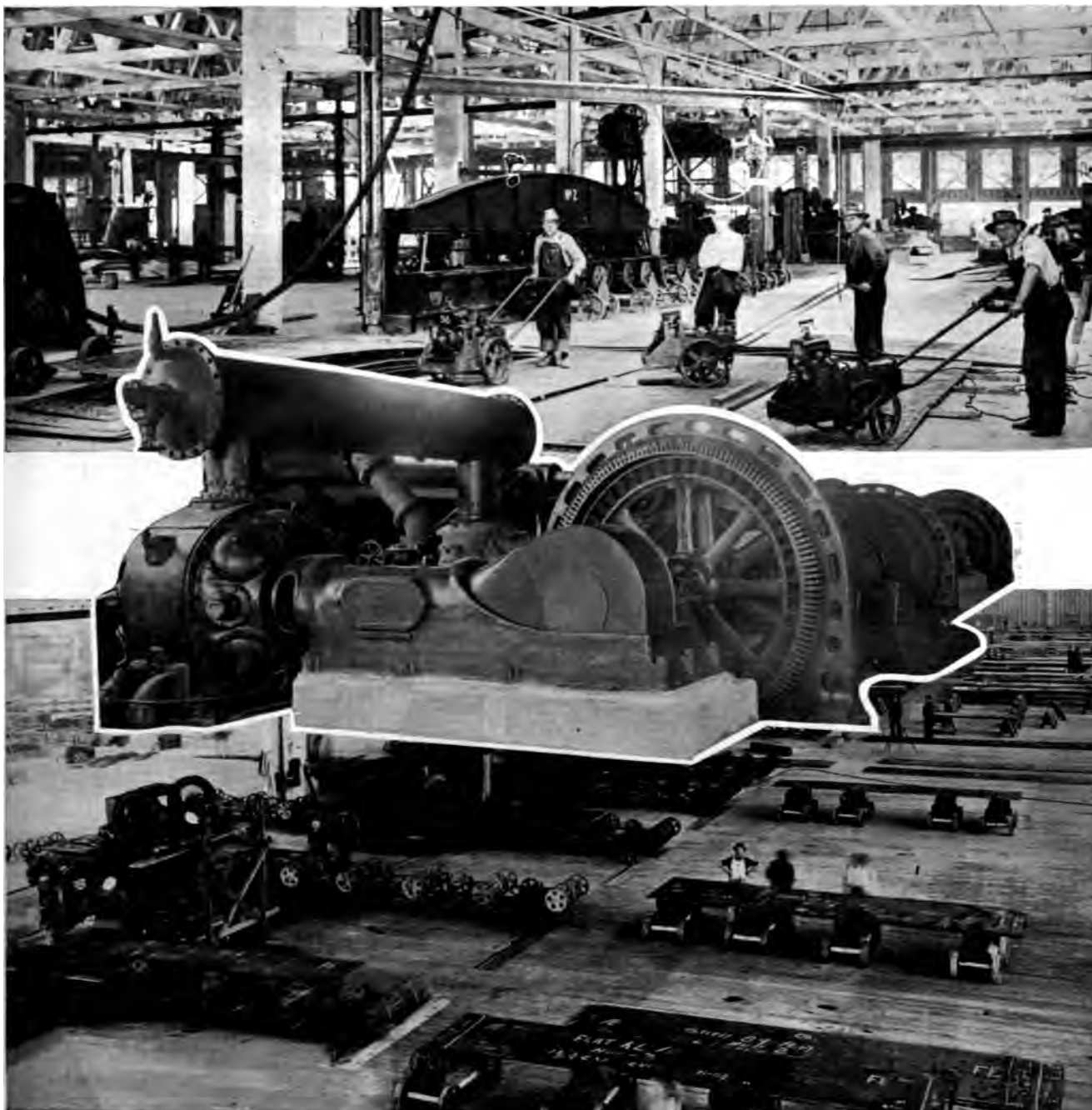
The G. M. Standifer Construction Corporation

AT Vancouver, Washington, on the north bank of the Columbia River, the G. M. Standifer Construction Corporation started last February to transform fifty-seven acres of duck marsh into a modern steel shipyard. On July 13th, last, Charles M. Schwab, director general of the Emergency Fleet Corporation, punched the first hole in a plate for the first steel hull. By October 13th, the plate shop was handling 200 tons of steel as a daily average. And the yard will soon have the capacity for turning out a completed steel ship every two weeks.

Perhaps the best idea of this plant may be gained by following the materials from their entrance into

the yard until, in a completed hull, they leave the ways. There are now four and shortly will be five miles of railroad trackage within the shipyard. These provide tracks for handling steel, lumber, fuel, general stores, and scrap. After the materials are unloaded they are forwarded to point of use by means of travelling cranes, locomotive cranes, tractors, push cars, or wagons.

When a car of steel arrives, the Standifer locomotive brings it into the yard and spots the car at the plate storage yard, which is fed by four railroad tracks and has two sub-divisions—one for shapes and one for plates. The plate yard is also in two divisions—the first is for plates to be



G. M. Standifer Construction Corporation, Vancouver, Wash. Upper view shows the portable countersinkers in the plate shop, with planer in the background. The middle view is of the electrically driven air compressor, and the lower view is of the plate shop showing layers out and double end punches

stored flat, that is, material which goes into the plate shop to be marked from mould loft templates; in the other are stored on edge all plates that are lifted from the ship or can be considered as stock and have to be handled singly. These storage spaces are 600 feet long and 75 feet wide. The plates stored flat are handled by a 25-ton crane equipped with two trolleys, to each of which a magnet is hooked. The other plates are handled on a 10-ton crane. By means of these cranes it is possible to discharge a car of steel in six lifts.

The plates stored flat may be picked up, when wanted in the plate shop, either one at a time, or as many as seven at a time, by the magnet crane, and they may be carried and dropped one or more at a time, as desired, upon the piles to which they are consigned. By means of this magnet crane they may be very quickly sorted and delivered to the cars upon which they are transferred to the layers-out, in the space directly under the mold loft.

The plate shop is divided into five bays, running lengthwise through the building. In the first of these are handled all raw plates which require to be planed, counter-sunk, or scraped. To the second bay comes those plates which require to be flanged, or man-holed, such as floor plates and brackets. The third is for straight angles and channels. The fourth is for crooked angles, after being furnaced. The fifth bay contains the angle-smith's fires, the blacksmith fires, two steam hammers, each having an oil furnace of the corporation's own design, and the rivet machine, with its continuous furnace, also of the corporation's own design.

In its equipment are eight double-end plate punches and seven angle punches. The plate punches are arranged to handle plates up to 30 by 8 feet in size. Six of them are equipped with roller tables, that they may be operated by one man. The other two are equipped with jib cranes or small tables that they may deal with shaped or small



Mr. Guy M. Standifer, President of the G. M. Standifer Construction Corporation

plates. There are two planers and one set of bending rolls for 30-foot plates, the top roll of which is 30 inches in diameter and weighs 40 tons; one set of angle or straightening rolls; a set of mast rolls; two plate shears mounted on turn-tables; one double angle-shears; a guillotine shears capable of handling a plate eight feet wide and one inch thick, and a bevelling machine. All these machines are direct driven and are supplied by Hilles and Jones, Wilmington, Delaware. All are safeguarded with the latest approved protective devices. In addition there are two large hydraulic machines, one of 250 tons capacity, for cutting manholes or flanging or joggling plates, and the other the jogging press, the vertical ram of which has 350 tons capacity and the horizontal ram 150 tons, for joggling angles, channels or plates cold, or for pressing furnace plates. These are supplied by the Camden Iron Works of Camden, N. J. There are also one double-ended plate furnace, 30 by 8 feet and one double-ended bar furnace 60 feet long, both of the corporation's own design, and both oil-fired from burners of the Standifer Corporation's make. The bending slabs are 55 by 50 feet for bars and 40 by 25 feet for plates.

Outside the plate shop, and between it and the ways, is an assembling space large enough to permit all bulkheads, engine and boiler casings, tunnels and deck houses to be assembled and riveted in as large sections as are found convenient. After being completely finished they may be picked up by one or more of the large travelling tower derricks and erected, complete, in place.

These travelling tower derricks run on rails of 23 feet gauge and are operated by steam and chain driven. They are of a design supplied by the Pacific Derrick & Hoist Company of Seattle, and have booms of 80 foot length, or of a capacity to reach both sides of a ship in the stocks. They have a rated capacity of ten tons and have already, working in pairs, erected bulkheads weighing twenty tons each. There are tracks for six of these travelling tower derricks, but only four have been installed for the present, as it is a very easy process to shift from one berth to the other when desired. They are capable of assembling and erecting material in pieces of reasonable size at the rate of 20 tons an hour. They can travel up from the berth to the assembling space and gather up what is wanted, or they may be left at the side of the ship and fed by locomotive cranes, tractors or push cars, as desired.

The G. M. Standifer Construction Corporation has five ways in its steel shipyard, of a good average declivity, and built parallel, so that all shores and blocks are of the same height and are interchangeable. All this part of the yard is covered

with planking or concrete and the space underneath is filled solid with sand so as to prevent danger from fire.

At the lower end of the plate shop, handy to the rivet-making machine, which has a capacity sufficient for all the rivets that will be used when the plant is in full operation, and will make some for outside use as well, is the general rivet storage space, in which about 120 large bins have been erected for the storage of rivets of different sizes. From thence, as needed, rivets are taken to the "help yourself" rivet bins, erected at an equal distance from the furthest ways and easily available to the worker's need. These are filled up daily.

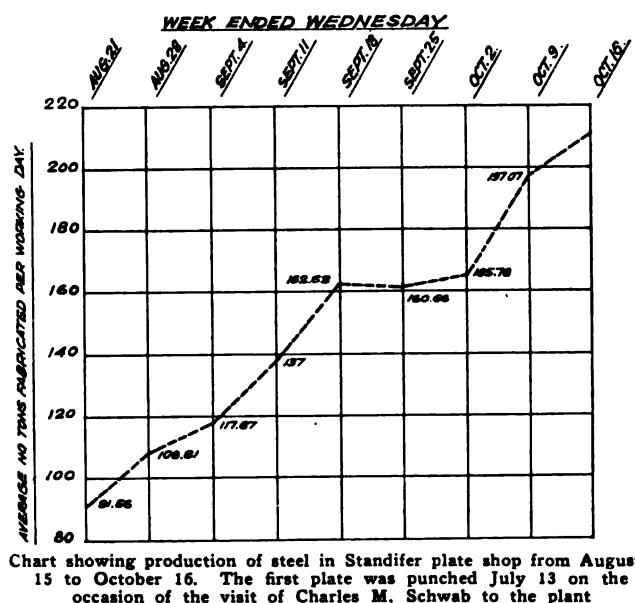
The lumber storage at the Standifer Steel ship yard is in the west corner of the yard, the furthest distance possible from other buildings and offering the least possible danger from fire. From there material is transported to the saw mill and joiner shop, which is located at the lower end of the yard, equi-distant from the outfitting dock and the ways, by means of flat cars.

The lower floor of the joiner shop is a saw mill equipped with all the machinery necessary to the needs of the yard. After the timber is sawed it is taken by an elevator up

to the second story where there is an ample space for seasoning fine lumber. Besides machinery for planing and moulding the lumber, the lower floor has a room big enough to permit the erection within it of four wooden deck houses, which, after the joiners have finished their work, may be lifted complete by one of the big travelling tower derricks and passed from one to another across the ways to the hull which they are to fit out. Upstairs the lumber goes to the cabinet makers, where it is machined, put together and sand-papered. An elevator lowers it then to the polishing room, an absolutely dust-proof room, where it is finished and stored. The joiner shop is 160 by 60 feet in size and is fitted with an exhaust system to carry away all sawdust and shavings. Eventually this will be extended to the power house, where the waste will be used to develop steam for the heating plant.

The paint shop is another evidence of the thought which has gone into the laying out of the Standifer plant. It is built along the same parallel line as the joiner shop, and is the same distance from the ways and equi-distant from the outfitting wharf. It is a one-story building, 70 by 40 feet, with concrete floors. One part of the floor is raised to the height of a railroad car to permit freight to be rolled out and the cars released quickly.

Placed properly near the plate shop, which is, and always will be, the largest user of power in the yard, is the central power station. It is of reinforced concrete, 50 by 100 feet, and is constructed in four units, for air, electricity, steam and water. There are three air compressors having a present capacity of 11,000 cubic feet, and there is room in the com-



pressure house for at least one more machine with a capacity of 5,000 cubic feet. There are two rotary converters, each of 150 kilowatt direct current capacity, and two hydraulic pumps, each of which is capable of performing all the duty required for the present, but there is also room for a third. The main switchboard is arranged so that it may be added to as further machinery is installed. In the boiler room, adjoining, are the boilers for generating steam to operate the steam hammers, to atomize the oil burned in the furnaces and for the



Mr. Charles F. Swigert, Vice-President of the G. M. Standifer Construction Corporation

general heating plant. This is in an off-shoot of the main power house. In another off-shoot are the transformers which take in the electric current at 11,000 volts and transform it to 440 volts for general machinery and a 220 volt direct current for the use of the overhead travelling cranes. A third off-shoot contains the pumps used in connection with a well sunk for drinking and sanitary purposes. These pump 300 gallons a minute. Fire risks are cared for by pumping direct from the Columbia River into fire mains which carry to every corner of the yard. Fire doors and walls separate the departments of the power plant.

The compressors are furnished by the Ingersoll-Rand Company and discharge into four receivers immediately outside the power house, from which the air is carried in exceptionally large mains to the furthest ends of the building berths, to the wet dock, and to all places where air is used for power. The hydraulic machinery was furnished by the Worthington Company and works at a pressure of 1200 pounds to the square inch at present, which may be raised to 1500 pounds when desired. This hydraulic machinery is all fitted with water savers, which permit the use of pumps of comparatively small capacity to furnish the needed water. Hydraulic power is also used for bending frames and furnace bars generally, by use of portable bulldozers of the Swan & Hunter type, made by Hilles and Jones of Wilmington, Del.

A building in the form of an "L", 212 by 96 feet, contains the pipe-fitters shop, the sheet metal shop and the machine shop. Like the paint shop, the joiner shop, and the store house, as well it is situated equi-distant from the ways and the wet dock. The pipe shop is fully equipped with racks and bins, pipe threading, pipe bending, and large expanding machines, bending blocks, forges and work benches. The sheet metal shop contains all needed

equipment for fabricating everything necessary to the production of ships. The water end of the "L" consists of one part containing all small lathes, drills, shapers, turret lathes, and work benches for fitting up.

The other part of the "L" is a high-roofed building 50 feet wide and served by a 10-ton crane. It contains the large shafting lathes, milling machinery, planers, boring mill and shapers and is amply large to allow all shafting to be assembled, condensers to be built and rudder frames to be put together. A very complete tool room is built into this building.

The Standifer Steel yard's fitting-out dock runs parallel to the Columbia River and is 700 feet long by 100 feet wide. But one side opens on the river. It has two main railway tracks, with another track running parallel to the front of the dock for locomotive crane service.

The large set of shear legs now being installed is capable of lifting 75 tons. It is similar to that in use at the Columbia River Shipbuilding Corporation's plant and will be operated by a large electric winch, made by Smith and Watson, Portland.

Provision has been made to extend the dock when necessary a length of 1100 feet. Its level



Mr. J. A. Sim, General Manager of this important Pacific Coast industry

is the same as the general level of the yard—that is, thirty feet above zero.

But little of the plant yet remains to be described. The time gates are ten in number, each arranged to take care of 200 men on a shift. As an employee enters the yard each employee calls his name and is given a brass check which he wears while working. This he turns in as he leaves the plant. The employees enter and leave in single file.

Between the time gates and the main entrance gate is a little house for the captain of guards and the watchman, and across from this is the emergency hospital or first aid room, which lies half within and half without the yard. It consists of a waiting room, a ward with two beds for serious injuries, and a large dressing room opening off the latter. The doors are large enough to allow an ambulance to draw up without entering the yard. A space between this building and the workshop part of the yard is left for the erection of a room and locker rooms to be constructed at a later date.

Along a line running from the time gate past the first aid room and on to the machine shop are built



The Government is helping the Standifer Corporation meet its labor problem by building homes for shipbuilders close to the plant. The central photograph is that of the Liberty Hotel, of 300 rooms, all outside, semi-fireproof construction, now in operation. The other photographs show the types of model shipworkers' cottages sold to the men at cost on easy terms.

also the yard offices, the tool room and the store house. The first provides office rooms for the general manager and his secretary, the superintendents, the foreman, the under-foremen, the electrical engineer, the mechanical engineers, the inspectors for the Emergency Fleet Corporation, and the representatives of the classification societies.

A tool room opens off the main stores building, and is centrally located for supplying air machines and small tools generally. It is of one story and occupies a space of 96 by 25 feet. The main stores building covers an acre of 192 by 96 feet and has three floors, the first of which is built upon a level with the floors of the railroad cars, to facilitate unloading heavy material. The three floors are connected by an electric elevator, and there is a complete arrangement of bins and racks for the storing of fittings, gaskets, and stock material generally. The top floor is divided into compartments to care for the lighter materials that enter into each ship's outfit. In order to avoid the necessity of taking miscellaneous castings into the main stores building a large casting platform has been erected across a drive-way, opposite the main stores and convenient to the machine shop.

Such is the physical arrangement of the Standifer Steel shipyard. Back of it is an organization of Western business men—men who have done big things, just as efficient, just as compact. There is a close personal contact not only between the men who compose the corporation and the executives, but between the executives and the employees. Many of the workers in the organization are men who have followed President Guy M. Standifer in his contracting experience covering a number of years. Others are men long associated with Vice-President Charles F. Swigert in a career of construction

and steel production which is almost co-incidental with the development of the Columbia River district. Mr. Standifer is only a young man, but he has achieved big things in a big way. As a railroad builder he constructed the O. W. R. & N. lines in Cow Creek Canyon, from Arrow Junction to Hooper, through Marshall Canyon into Spokane. That Arrow Junction line is so built through tunnels that railroad men know it as the "subway." The others, as engineering and construction feats, are not less notable. But the greatest achievement of Mr. Standifer and the workers in his organization came on July 13 last, when the G. M. Standifer Construction Corporation, in its wooden shipyards, established a world's record and launched six vessels, in honor of the visit of Charles M. Schwab to the Columbia River district.

Mr. Charles F. Swigert, vice-president of the corporation, has had a long career in the big development enterprises of Portland. He constructed the Interstate Bridge between Portland and Vancouver, the largest steel bridge of the kind in the world. Many of the other steel bridges in the vicinity of Portland have been erected by him as head of the Pacific Bridge Company. Mr. Swigert was formerly chairman of the Port of Portland, and under his direction the port made its greatest strides. He is interested in the Willamette Iron and Steel Company, the Electric Foundry and many other of Portland's most important industries contributing to shipbuilding. He was responsible for the establishment of the Foundation Company's wooden shipyard at Portland and for the big success of that yard until he resigned to become affiliated with the Standifer organization.

With such an equipment and with such an organization, the G. M. Standifer Construction Corpora-

tion must go far. That it has not gone further up to the present time is due to a shortage of labor. Many of the employees are necessarily picked up around Vancouver. Many are ranchers, now in 1918, turning to shipbuilding. A story will illustrate the problem as it affects ship construction: Clarke county, in which Vancouver is situated, is probably the most productive prune belt in the world. A few weeks ago there was a sudden exodus of labor in the steel yard. Investigation revealed the cause at once. The shipbuilders had quit work to harvest their prune crops!

To meet the labor problem the government is aiding through the construction of homes for workers. The Emergency Fleet Corporation has set aside \$850,000 for this end. The Liberty Hotel, financed with government aid, which has 300 rooms, will be in operation by the time this article appears in print. So, too, will be the first of 100 model workingmen's cottages to be sold to Standifer employees through the Vancouver Home Company, at actual cost. Also there is at the present time under consideration an apartment house with 200 apartments, two-room, three-room, four-room, which will be under roof within eight weeks.

George F. Rodgers and Company

GEO. F. RODGERS & CO., shipbuilders at Astoria, with Geo. F. Rodgers as president and general manager. They are builders of ocean-going steamers and cargo carriers for the United States Shipping Board, Emergency Fleet Corporation. Their plant is situated on a tract of seven and a half acres, at the mouth of the Co-

bolt threading and heading machines installed and a compressor room with two Ingersoll-Rand compressors, motor driven, which furnish the air for 100 air hammers, dubbers, groovers and planers.



J. P. O'Connor, Assistant Manager

lumbia River, bounded on the northeast by the piers of the Port of Astoria, and on the south by the S. P. & S. Railway, which affords them the best of shipping facilities.

The original site was a rough, rocky beach, which has been filled in by dredging from the river bottom and planking over the entire area.

On July 15th, 1917, four berths 300 feet long were started, with launching ways extending 210 feet. A modern four-fire blacksmith and machine shop was built, with punch and shear, radial drills,



D. M. Field,
Secretary and Treasurer George F. Rodgers & Co.



L. R. Lange, Engineer

A joiner shop is equipped with machinery to turn out the joiner and cabinet work complete for a modern wooden ship. A saw shed was built, in which were installed two ship saws, a cut-off saw, a resaw and a Stetson-Ross planer.

A two-story building 52 by 120 feet was erected, which houses the auditing, executive and Government inspectors' offices, and the store-room, on the first floor, and the mold loft and drafting rooms, on the second floor. Oakum, treenail, paint and other material stores were built in the south side of the yard, and

also a concrete incinerator for burning refuse.

All machinery was in operation by October 1st, 1917. The first keel, for a 3500-ton wooden ship 281 feet long, was laid in October and the other three at intervals of one month.

The heavy fitch timbers are towed from the mill to the booming grounds of the company, pulled up a slide, moulded, picked up by a travelling crane, transferred to the saw shed and run through the saws, picked up again by the travelling crane and taken to the framing stage, where the frames are assembled and are then raised into place on the keel.

The planking, decking and beams are stored in the north end of the yard, opposite the saw shed and near the travelling crane, so that this material can be easily transferred to the saws and steam boxes. Materials are carried up to the main decks by the use of derricks 120 feet high, with 60-foot gaffs, one at the bow of the ship and one at the stern, the bow derrick being operated by a steam donkey and the one at the stern by electricity.

There are 650 men employed in the yard, and fifty women spin oakum and do the sweeping.

In order to furnish housing facilities for the employees, the company secured a slightly tract of land on the river front, on which fifty small houses were erected. A hotel is being built, with shower baths, recreation rooms, etc., which is also on the river near a fine bathing beach. There is a cafeteria in the yard which serves luncheon to the employees.

The first launching took place on the Fourth of July, 1918, at 10:45 p. m. The ship was christened the "Blue Eagle," Miss Margaret Rodgers, daughter of the president and general manager, acting as sponsor. Notwithstanding the late hour, necessitated by the tide, it was a gala event.

On October 8, 1918, the second ship was launched and christened the "Capines" by Mrs. Geo. F. Rodgers, wife of the president of the company. Immediately afterwards the keel for ship No. 6 was laid and a frame raised in seventy-four minutes, which is, we are informed, a record for wood shipbuilding yards.

Immediately after this launching the keel for ship No. 5 was laid, and it is progressing rapidly.

In auxiliary ship plants alone, where boilers and machinery are being manufactured, Portland has a total of 5000 men employed, according to a census completed October 15. In thirty of these plants, affiliated under the United Metal Trades Association, 4700 men are working and the average wages are between \$5.50 and \$5.75 a day. An idea of the rapid growth of some of the larger establishments is shown in the case of the Willamette Iron & Steel Works, which had 250 men in August, 1917, and today 2700 are retained there. At the Smith & Watson Iron Works, Hesse-Martin Iron Works, Electric Foundry, Pacific Marine Iron Works, Hessler Machine Works and others, the forces have been extended materially in the same time.

W. E. Russell, of New York, turbine engine expert of the Shipping Board, was in Portland during the month to confer with officials having to do with fitting out steel and wood ships, also to look over the first vessels to receive 3000 horse-power engines. In the past, 2500 horse-power has been the maximum, but it was determined to increase

the power, and the understanding is that all to follow will be equipped with the same gear, with a possibility that the engines will be increased to 3200 horse-power. Portland has the honor of being the home of the only wood steamers in the United States building for the Emergency Fleet Corporation engined with turbines, they being of the Peninsula Shipbuilding Company's fleet. Trials so far have proven the steamers most satisfactory and the use of turbines is to be continued by this plant.

One visitor during the month was Prince Axel of Denmark, vice admiral of the Danish Navy, who is touring the United States to study economic industrial conditions in the interest of his country. He was piloted through the principal shipyards and then shown the inland stretches of the Columbia River. Adhering to a request of the State Department, he declined to make known his impressions on any subject.

Guy M. Standifer, president of the G. M. Standifer Construction Corporation, which operates three shipbuilding plants, a steel and wood yard at Vancouver and a wood yard on North Portland Harbor, has returned from the East after an absence of several weeks, much of which time he spent in conference with Emergency Fleet Corporation officials in discussing the future ship programme. The Standifer plants are assured of sufficient patronage so long as the government requires tonnage.

Alfred F. Smith, president of the Columbia River Shipbuilding Corporation, has departed for the East and while there will ascertain prospects as to a continued delivery of steel in adequate amounts during the winter. The Portland yards expect present receipts will insure their having stocks ahead for about three months. While a slowing down is looked for during unfavorable weather in the East, through the output of steel mills being curtailed, also transportation facilities from the East being interfered with by snow, it is hoped to carry on work with no greater interference than was experienced last year.

Headway attained by the Sea Service Bureau of the Shipping Board in furnishing crews for new vessels has done away with the necessity for signing inexperienced persons, so an order has issued from the office of E. J. Griffith, in charge of the work in the Northwest, that only experienced men will be accepted. Meanwhile ships are being manned by graduates of the West Seattle training station, all in natty blue uniforms.

Through the resignation of R. W. Montague as examiner for the Oregon district of the Macy Wage Adjustment Board, headquarters of the Oregon and Washington districts have been established at Seattle under Judge McBride, former governor of Washington. Arthur Jones has been named assistant examiner for wood yards in Oregon and Joseph Reed assistant examiner of steel yards.

S. S. "West Kyska" is the name of the seventeenth hull to be launched by the Northwest Steel Company, she having been floated October 7th. The ship was christened by Mrs. Gerald Beebe, sister-in-law of Walter B. Beebe, vice-president of the company.

Additional contracts awarded for Ferris ships include four to the Coast Shipbuilding Company, two to the George F. Rodgers Company, and one to the St. Helens Shipbuilding Company.

The Equipping of Modern Ships at the Mouth of the Columbia

THERE has been much interest, among marine engineers, in the recent successful trial trips of the two first Government wood ships to be completed in the Lower Columbia River district—the "Quoque" and the "Astoria". Their

completion has fully established Astoria, at the mouth of the Columbia, as an important Pacific Coast shipbuilding center. And the exceptionally high ratings awarded these ships as a result of their trial trips gives prominence to their equipping plant, the Astoria Marine Iron Works, located on Pier Two of the Port of Astoria docks.

The Astoria Marine Iron Works, within less than a year, has developed into one of the largest and most efficient ship equipping plants in the entire Columbia River district. Its remarkable growth is an illustration of that quality of rapid-fire American achievement which has made our nation the wonder of the civilized world, in our present speed of ship construction. The story of the development of the Astoria Marine Iron Works goes back to personalities.

About a year ago two Portland men, W. A. Viggers and Thomas Bilyeu, became associated in the prosecution of war-emergency work. Viggers was owner and manager of a local machine shop and iron works. Bilyeu is a business organizer and a mechanical engineer as well, with more than forty domestic and foreign patents to his credit, varying from complicated coin-paying devices now in national use to massive automatic machines which have revolutionized the mine-timber framing industry of the West. They met in the business of designing and manufacturing a new bolt-heading machine demanded at once to meet a critical local shipbuilding emergency.

Other engineering activities followed. They organized a company. They were joined by a third practical young engineer, J. R. McKinney, owner



Single propeller screw, 14 feet 3 inch diameter. Cast and machined in plant of the Astoria Marine Iron Works. The two shafting lathes are also shown finishing last of an order of 120 shafts



and operator of an Oregon foundry. They investigated the need of a fully-equipped marine iron works at the entrance of the Columbia, where were already located there three going wood ship-yards — McEacherns', Wilson's and Rodgers' — with a total of fourteen ways. As it happened, the first person whom they met in Astoria was Mr. B. F. Stone, president of the Port of Astoria. The Port Commission had recently completed on Pier One a great warehouse, more than a quarter-mile in length and enclosing more than four acres of warehouse floor space; and the port was also completing on Pier One a million-bushel grain elevator.

But Pier Two of the port docks was practically unoccupied, with the exception of a large modern municipal coal bunkers. The Port Commission co-operated. The new company was allotted a long-time building lease on a considerable portion of Pier Two—and today, less than a year later, the varied ship-equipping activities of the Astoria Marine Iron Works occupies the greater part of the entire pier, with its ten and a half acres of surface, with its more than 3000 lineal feet of deep-water wharf-head paralleled by double standard-gauge railroad tracks, where three locomotive cranes, the largest with 85-foot boom and with a lifting capacity of fifty tons, are in operation twenty-four hours of the day. Pier Two is located on the main channel of the Columbia River, in fresh water, with a minimum depth at the docks of thirty feet, and ten miles from the Pacific Ocean through a harbor en-

trance having a controlled depth of forty feet at low tide.

First construction work on the plant of the Astoria Marine Iron Works was begun in late November, 1917. Machinery was first turned in March, 1918. At that time the ultimate vision of the company was a total of 350 employees, and the five original buildings were planned on



Works accomplished at the plant of the Astoria Marine Iron Works. The lower photograph shows hulls awaiting installation of machinery at this plant

that basis. The original machine shop, 90 by 110 feet, specialized in lathe work, and one of their first orders was 120 propeller shafts for the French government.

Early in April, 1918, the company was awarded, by the Emergency Fleet Corporation, a contract for the final fitting of ten of the Government wood ships of the Lower Columbia River district, including Tillamook Bay, and this contract was soon increased to twenty ships. This contract hastened the construction of additional plant buildings, and the assembling of additional equipment for machine shop, foundry and pipe shop.

An extension, 50 by 90 feet, was added to the machine shop, making the total present dimensions 90 by 160 feet. This building is served by two travelling cranes, the one with a 30-foot span and a lifting capacity of ten tons and having a track-age length of 110 feet. The track of the second newer travelling crane runs at right angles to the old track, and this crane has a span of fifty feet and lifts up to twenty tons.

The company shop is one of the most completely

equipped for its special work of any in the Columbia River district. It has a total of fifteen lathes. Two of these lathes will handle shafting thirty feet between centers. One of the engine lathes has a swing of 56 inches, and is 21 feet long; and a new pit lathe will have a swing of 15 feet. A hydraulic press of 500,000 pounds has been set. A special horizontal boring mill for propellers has been made up, for the final finishing of the 6-ton propellers cast in the company foundry. In addition, the machine shop is equipped with a 60-inch boring and turning mill, a large No. 4 Le Blond milling machine, three new radial drills of the best make, a tool-maker's lathe, shapers and planers and key-seating machines and cold cut-off saws, and other like tools.

The forging shop, 30 by 110 feet, has seven fires and four more are being added. It has two large power hammers, a large punch and shear machine, a bolt threading machine; and in this building is located two air compressors with a combined capacity of 500 cubic feet per minute, supplying air to all the shops and entirely around the pier. Also is located here the generating plant for the oxy-acetylene used in burning and welding in different parts of the plant.

The pipe shop is a building 90 by 110 feet, with a travelling crane, completely equipped with large pipe-threading and cutting machines, and punching and drilling and shearing machines. It has two bending tables, and a hydraulic press with a 100-ton push, and two forges. The pipe shop has a complete sheet metal department, and a copper pipe department complete, fully equipped for all brazing, welding, bending, drawing and expanding.

The foundry, 110 square feet, equipped with travelling cranes has two furnaces, and usually pours from ten to fifteen tons of metal daily. The foundry casts all dock and other fittings necessary for the final completion of the wood ships of the district, including hawse pipes and propellers. The present order of propellers, now under construction, are fourteen feet three inches in diameter, and weigh between six and seven tons.

The Government store room is 90 by 110 feet, two stories, headquarters for eight million dollars worth of Government property on the pier. One corner of this building is utilized as a company dining room, where the foremen and officials meet daily at the noon hour. Some of the newer buildings include the emergency hospital, and the central fire station, headquarters for the company fire department, where are established two hose carts and a large chemical. Another building, 32 by 80, two stories, includes space for the large new tool room, with nine checking-out windows, and 700 individual tool boxes. On the second floor of this building is the drafting room; also the superintendent's room, overlooking the plant, a convenient central location where the foremen of the plant meet often in conference.

The Astoria Marine Iron Works, at the date of this writing, has fully completed two wood ships, the "Quoque" and the "Astoria", the former a 3500-ton Ferris type and the latter a 3500-ton Hough type, both of which were promptly accepted by the Emergency Fleet Corporation. On the "Quoque", so perfect was the operation of the engines and the auxiliaries in every particular, that the ship was awarded the highest possible rating, "fifteen years", an honor seldom bestowed.

At the present writing two other ships have just

left the docks of the Astoria Marine Iron Works for their trial trips—the "Lonoke" and the "Salmon." The "Lonoke", a 3500-ton Ferris type ship, on her trial trip, made the return run from Portland to Astoria in seven hours and twenty-six minutes, which is stated to be the fastest time ever recorded for this trip for a ship of this tonnage. Four additional wood hulls are tied up at the docks of the Astoria Marine Iron Works in various stages of installation. The delivery of materials granting, the company will be able to maintain a trial trip schedule of one additional completed wood ship every seven days or better.

But the company plans more than that. The officials and the foremen and the 1200 and more men will not be satisfied merely with good accomplishments. They are definitely out to do what they can toward hastening our national shipbuilding program. They are after records. They have made the plant to express a spirit. They have adopted a slogan, conspicuously posted on a large board in the center of the yard: "Fight While You Work—And These Ships Will Sail on Time."

CHANGES IN ORGANIZATION

EMERGENCY FLEET CORPORATION

The Emergency Fleet Corporation during the past two months has been putting into effect organization changes. The new plan provides a district manager in each district, to have charge of all branches of construction work—wood, steel, composite, and concrete—as well as of all departments indirectly connected with construction, such as the Industrial Service Division and the Plant Engineering Department.

So arranged, the organization consists of three principal groups in each division: First, the Construction Division and allied branches, under a district manager; second, the Supply Division, dealing with purchase and allotment of materials and equipment; third, the Auditing Division.

On October 1 this system was put into effect in the Eighth District and Capt. J. F. Blain was appointed district manager. Effective on the same date, Captain Blain made the following appointments: D. M. Callis, assistant in charge of steel ship construction, with headquarters at Seattle; F. B. Pape, assistant in charge of steel ship construction, with headquarters at Portland; Capt. A. Magee, assistant in charge of wood ship construction, with headquarters at Seattle; P. Davis, assistant to the district manager.

Another feature of the change being made by the Emergency Fleet Corporation is the consolidation of some of the districts into larger groups, with names instead of numbers. The boundaries of the Pacific Coast districts remain unchanged. The district formerly known as District No. 7, of which Capt. A. F. Pillsbury is district manager, is now known as the Southern Pacific District, and former District No. 8 as the Northern Pacific District.

This district under Capt. J. F. Blain's jurisdiction now includes wood and steel ship construction in the State of Washington and steel ship construction in the State of Oregon. The wood ship construction in Oregon is still known as Dist. No. 1 under Dist. Supervisor L. J. Wentworth at Portland.

We extend our congratulations to Captain Blain on this promotion and our best wishes for the continued success of the Northern Pacific District in its record-breaking construction work.

The Port of Astoria

THE Port of Astoria Commission, comprising Mr. B. F. Stone, president; Mr. Geo. W. Sanborn, vice president; Mr. Frank Patton, treasurer; Mr. George W. Warren, secretary, and Dr. Alfred Kinney and Mr. R. R. Bartlett, chief engineer and manager, must feel a distinct sense of pride when they reflect on what has been accomplished for the Port of Astoria under their able guidance during the past five years.

Prior to the year 1913 a large portion of the business district of Astoria was built on stilts. The streets were of wood, necessitating continual resurfacing, and in addition to this, the rise of the tide flooded a considerable portion of this section of the city. This, however, is no longer the case, as a reclamation commission of energetic men was created who have built a sea wall along the greater portion of the waterfront and have pumped a sand fill in from the main channel of the Columbia River on which was constructed hard surfaced streets throughout the business area of the city.

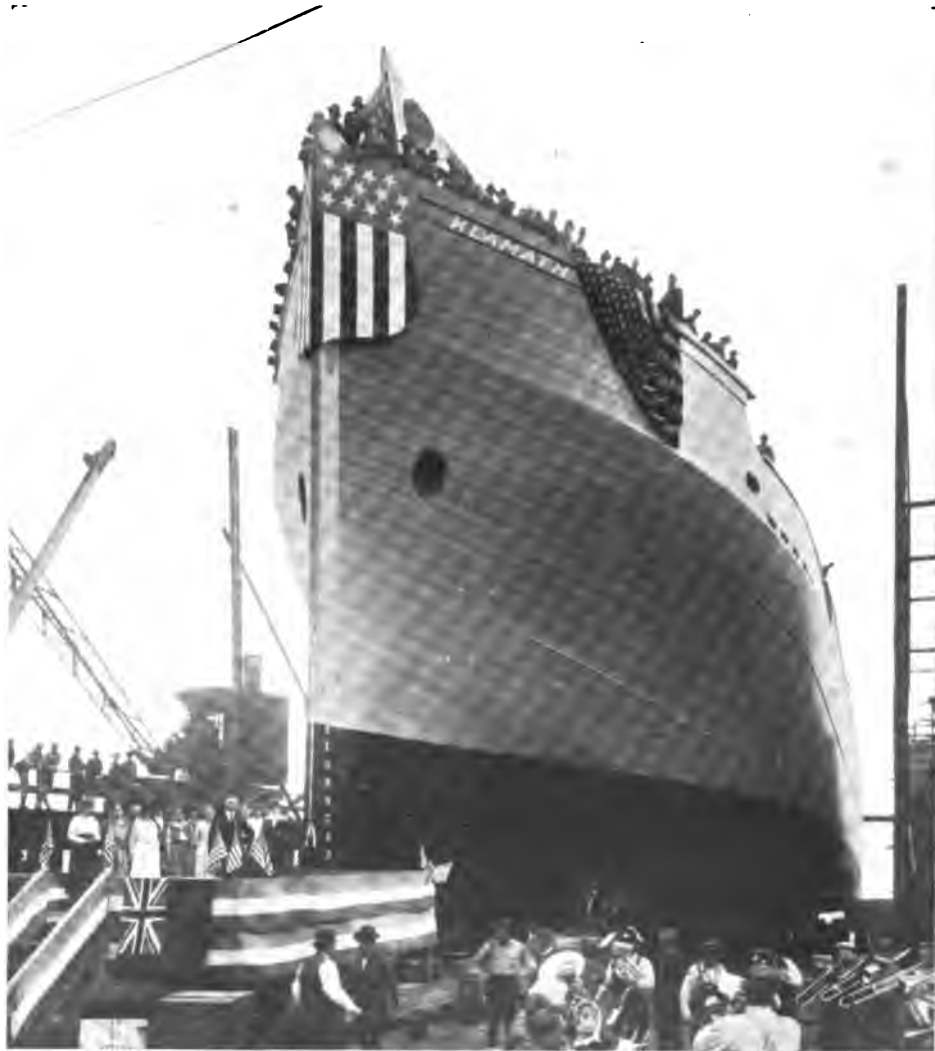
This remarkable achievement has been accomplished through the efforts of the Commission of the Port of Astoria, which is made up of practical business men who are well acquainted with the requirements and problems of the community. There has been a business-like administration of an immense program of construction, which when completed will make Astoria one of the principal Pacific Coast ports. One of the most important reasons for the success of this project is the fact that each engineering problem has been handled on a broad-minded business principle, free from any politics or outside influence. The city of Astoria is surely to be congratulated on its good fortune in having such an able group of business men to handle the development work of their port. The Port of Astoria Commission was created by the Oregon Legislative Assembly in 1909, with an elective board of five commissioners, and authorized to do whatever was necessary for the exploitation of the commercial and constructive advantages within the port district. Until 1913 very little was accomplished, with the exception of the acquisition of sixty acres of land and tide flats. This area has now become the nucleus for the great rail and water terminal which

has been developed within the last few years and to which additions are still being made. Among these additions, mention might be made of 7000 feet of water frontage adjoining the present property on the west, which purchase was made during the summer of this year.

The first work undertaken by the present commission was the construction of bulkheads along the waterfront, the dredging of sand from the river bed, which was pumped on the inshore side of the bulkhead and the entire area filled above high tide.

The final approved scheme for development was in general plan that of piers and slips built obliquely to the direction of the river channel. A contract was let for dredging the slips between the piers and for filling the enclosed area formed by the bulkheads, making the permanent fill on which the later improvements were made.

The warehouse, which is ninety feet in width, is built "L" shaped, and altogether is nearly 1300 feet in length. Due partly to the construction of the building, aided by the installation of an automatic dry pipe sprinkling system, it was possible to obtain an exceedingly low rate of insurance.



S. S. Klamath" launched at the yard of the McEachern Shipbuilding Company, which is one of the five shipbuilding companies located at Astoria



ENTRANCE TO ASTORIA'S

Port of Astoria's

ADVANTAGES

Our Terminals are located 10 miles from the Pacific Ocean at the mouth of the Columbia River.

Harbor Entrance with controlling depth of 40 feet at low tide.

Modern Railroad and Steamship terminals, 5550 feet of docking wharves with 30 feet of water at low tide.

Bulk and sacked grain storage and shipping.

Coal and Lumber piers.



PLEASE MENTION THE PACIFIC MARINE REVIEW WHEN YOU WRITE



FRESH WATER HARBOR

Terminal Facilities

EQUIPMENT

Fresh water supply for ships.

Coaling equipment for discharging or bunkering by clam shell and conveyors. Electric derrick, hoist and clam shell rig.

Three locomotive cranes 15, 30 and 50 ton capacities each, operating along all wharves.

Gridiron and incline railroad track for heavy transfers of rolling stock. Electric ramps and inclines for small crafts.

Marine Iron Works offer quick repairs to vessels.



PLEASE MENTION THE PACIFIC MARINE REVIEW WHEN YOU WRITE

This warehouse is served by a most complete tracking system, both on the slip side and also in the rear. The track leading to the rear of the warehouse is known as a depressed herring bone system, which permits of the most expeditious handling of cars. Warehouses were located on Pier 1, these being constructed of interlocking hollow tile with heavily timbered slow burning roof construction. Pier 2 is being used for the assembling and handling of lumber and the storage of heavy freight. A complete and well-equipped coaling station, with storage for 20,000 tons of coal and equipped with bunkering at the rate of 175 tons an hour, has been built on this pier within the past year for the accommodation of steamers entering the port. In connection with this plant, a large capacity traveling locomotive crane is used for the handling of coal from barges and cars of storage, and is also equipped as a hoisting crane. Tracks having been laid the entire length and across the face of the pier, the entire frontage of Pier 2 is placed within reach of the crane.

On account of the ease with which grain may be handled by conveyors, the site on Pier 1 at the angle of the warehouse was selected as best suited for the location of the grain elevators. A work house was built last year for receiving bulk and sacked grain, and cleaning and grading machinery was installed. In connection with the warehouse the elevators could easily handle during the season upwards of two million bushels of wheat. It was thought that with the adequate warehouse facilities which the port had, all grain, which up to that time was being handled principally in sacks, could be cared for in the present warehouse, and that a suitable work house was all that was necessary until such time as the majority of producers indicated their preference in favor of bulk grain handling. As soon as this was definitely decided upon the Port of Astoria immediately made preparations to provide adequate facilities to handle bulk shipments and storage of grain.

A million-bushel plant is now completed and accommodates bulk storage for this amount. The entire plant is built of reinforced concrete resting on a pile foundation. Each storage unit has eighteen full-sized tanks, 22'-8" inside diameter and 76' deep. There are ten interspaced bins and four end bins in each unit, making a total bulk storage of approximately 520,000 bushels for each unit, or a total storage of more than 1,000,000 bushels. There are two conveyor tunnels running longitudinally under the tanks. The center row of tanks have outlets for discharging on either of the discharge belts. This allows a certain amount of mixing to be done as the wheat is drawn from the tanks. These discharge belts extend through and into the new work house, and deliver directly into the boots of the two large elevators which elevate the grain to the working bins for conditioning purposes. The same belts and elevators being used for shipping out. Grain can also be taken from the storage tanks and carried over the tanks to the sack handling house, if it is desired to sack grain which has been held in bulk storage. Such grain, after having been graded and sacked, would be conveyed directly to section 5 or 6 of the warehouse over a sack conveyor belt, where it would be placed in storage and held for shipment. This same sack

conveyor is so arranged that sacked grain which has been received and placed in storage in the warehouse can be conveyed from the warehouse to the elevator for conditioning or carried through to the bulk loading belt and be loaded out in bulk.

Ample railroad trackage for car storage and handling is provided on either side of the plant with receiving hoppers spouting directly from the hoppers to the elevator boots. These elevators have a capacity of 5000 bushels per hour and elevate directly to the receiving scales, from which the grain is dropped into the working bins and distributed as required. In addition to the receiving hoppers placed in the new work house, there are four hoppers in the present elevator which make it possible to unload from six cars at the same time.

The charging belt for the tanks is placed in the head house over the tanks. Trippers are located over each unit of storage for discharging into the various tanks. The tripper over unit number one is a four pulley reversible tripper, allowing grain to be drawn from either the new work house elevator or from the present elevator.

The receiving scales are standard hopper scales of 1600-bushel capacity draft; 2000-bushel garners located directly over the scales receive the grain from the elevators and discharge through four gates each into the hopper of the scales. A 20" diameter telescoping trolley spout connects the discharge gates on the scale hopper to the various work house bins.

The cleaning and scouring machines are placed on the main floor of the work house. The present installation in the new work house includes two separators of 2250-bushel hourly capacity each, and two horizontal dry scourers having an hourly capacity each of 600 bushels. These are so placed that grain may be carried to opposite sides of the work house and are fed by direct spouting from bin gates to the machines and discharge directly to the elevator boots in the basement. The present plant is also equipped with cleaners and scouring machinery.

Both work houses are equipped with endless belt man-lifts. Ample stairways and abundance of room has been provided for working in and around the machines, and to accommodate additional equipment.

The loading out conveyor connects with the new work house and conveys the grain from the loading out bins on a 36" belt conveyor to the waterfront in slip No. 1 at a capacity rate of 15,000 bushels per hour.

All machinery throughout the plant is electrically driven. The plant when complete will provide for a million bushels of bulk grain storage and one million bushels of sacked storage at one time. The arrangement allows the handling or loading out of both sack and bulk grain at the same time without interference one with the other.

Between pier No. 1 and No. 2 there is slip, or waterway, with an entrance 400 feet wide. The slip is easy of access and with room enough to dock four of the largest vessels at one time.

The three principal shipyards located in Astoria are on Smith's Point and in Young's Bay. The Geo. F. Rodgers Company, shipbuilders, are located on the Port of Astoria property, while the Wilson Shipbuilding Company lies just west on the

extreme point of land, known as Smith Point, which is the end of the peninsula on which is built the City of Astoria. West of the Wilson yard, about one mile, facing Young's Bay, is the McEachern Shipbuilding Company, one of the principal wooden shipyards on the Pacific Coast. The Astoria Marine Iron Works has a complete and well-equipped marine machine shop and foundry, and this plant occupies a large portion of Pier 2. All kinds of repairs and renewals are efficiently handled by this company, as well as the furnishing and installation of new marine equipment.

During the winter of 1917 and 1918 the shipyards were materially handicapped by the lack of rail transportation and adequate street approaches, and in consideration of this the Port of Astoria took up the matter of providing rail transportation, extending to the McEachern shipyard and the Astoria Pulp and Paper Company, located just beyond. This is directly a development of the belt line railroad controlling the waterfront throughout Astoria. Provision was made for this road in planning and laying out the Port of Astoria property and it will undoubtedly be a great factor in the development of industries, not only on the Columbia River side, but along the waterfront of Young's Bay on the southerly side of the city.

The port-owned dredge has filled by hydraulic dredging the grade on which the road is to be built, and an arrangement with the county commissioners has been made whereby the grade is built in sufficient width to carry a hard surfaced street paralleling the railroad. All material has been secured and the contract is well under way and will be completed about the middle of Novem-

ber. This not only allows all freight to be shipped directly into and from the shipyard, but will provide transportation for the pulp and paper mill, which requires a capacity of several cars daily.

The Port of Astoria has the following to offer shipowners and shippers:

Fresh water harbor, ten miles from the Pacific Ocean, on the main Columbia River channel, with a harbor entrance having a controlling depth of 40 feet at low tide. Safe approach, accessibility.

Modern railroad and steamship terminals.

Four acres of enclosed warehouse floor space.

Masonry walls. Slow-burning construction.

Lowest insurance rates.

Economical arrangements for handling freight.

5550 lineal feet of docking space, with a minimum depth of 30 feet at low water.

Fresh water supply for ships.

Grain handling and storage. Sacked grain conveyors to and from cleaning plant.

New reinforced concrete bulk grain storage plant—1,000,000 bushels capacity. Receiving, cleaning and shipping equipment.

Three traveling locomotive cranes for heavy package freight transfer, ranging from 15 tons to 50 tons capacity, also electric derrick for handling from barges to cars.

Adequate coaling facilities handling 175 tons per hours to ships' bunkers. Open coal storage for 20,000 tons. Bunker storage, 3000 tons.

Open dock storage for assembling lumber cargoes.

Gridiron and incline for transfer of railroad rolling stock from barge to track.

Astoria Marine Iron Works on Pier No. 2 offers complete facilities for renewals and repairs.

The Wilson Shipbuilding Company

SIX years ago Wilson Bros. established a small shipyard at Astoria. Here the steam schooners "Ernest H. Meyer," "Wahkeena," "General Washington," "R. Millers" and "Electra" were successfully built and equipped. When the demand came for wooden ships, Wilson Bros. merged into the Wilson Shipbuilding Company, secured additional acreage, and erected a compact modern wood shipbuilding plant, with four building ways, each 330 feet long, and suitable wood handling machinery for the construction of wooden hulls only.

Two locomotive cranes and a large Colby crane of the gantry type handle the material in the yard. Six hoisting engines are used on the ways. The saw shed is equipped with two American band saws, one Fay & Egan band saw and two Fay & Egan swing saws.

Three Ingersoll-Rand air compressors, two 14x12" and one 12x10", furnish pressure for the pneumatic tools. This pneumatic equipment includes a deck planer, an Astoria pneumatic tool planer, a Model A air planer, Little David caulking tools, David hammers and drills, and a Boyer air groover for straps.

The joiner shop equipment includes a Stetson-Ross straight planer and a bevel planer for angle work.

This company maintains a very fine emergency hospital and an excellent restaurant for the comfort and convenience of its working force.

Eight hundred men are employed, and four wood ships of the Ferris type have been launched by them on orders from the Emergency Fleet Corporation. The first of these—the "Quoque"—is now in commission and giving excellent service. The Wilson Shipbuilding Company contracts for the wooden hull only, all fitting out work being done by the Astoria Marine Iron Works, whose plant is described under separate heading in this issue.

P. J. Brix, president of the Wilson Shipbuilding Company, is one of the best known men on the Lower Columbia River. He is executive head also of the Knappton Mill and Lumber Company and the Brix Bros.' Logging Company. E. S. Collins, vice president, is associated with the Ostrander Railway and Timber Company, and J. A. Byerley, treasurer, is interested in the Silver Lake Railway and Timber Company.

Frithier Kaukkonen, of the old Wilson Bros.' Company, is secretary of the company and superintendent of the yard. W. G. Wray is office manager and purchasing agent.

FIREMAN'S FUND

Insures Hulls, Cargoes,

HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

G. KIRKHAM SMITH, Special Agent
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

"Causa Proxima"

AN interesting question, which may lead to litigation, has recently arisen in New York touching the liability of "war risk" underwriters or "all risks" underwriters for the loss of the tank steamer "Albert Watts."

It appears that the "Watts," loaded with fuel oil and gasoline in bulk sailed from New York in October, 1917, bound for a port in Italy. During the passage she was torpedoed or struck by a mine and one of the tanks was so damaged that the gasoline leaked out and spread over the water. The fires under the boilers were extinguished, but the steam was sufficient to enable her to proceed to an anchorage. The gasoline continued to leak from the hold and spread over the water and in some way became ignited. The fire spread to the ship and she was hurriedly beached. Before the fire could be extinguished she suffered material damage, probably sufficient to justify a claim for total loss. The question is as to whether the loss should fall on the "war risk" underwriters or on the underwriters against sea perils; in other words, what was the proximate cause of the loss?

In the issue of "Fairplay" of August 29th appears an extremely interesting communication from Mr. J. E. Withers touching on the case of the "Albert Watts" and on the question generally of proximate cause. Mr. Withers quotes from several authorities, among them as follows:

"The general principle is intelligible enough and easy of application in many cases, but there are cases in which a too literal application of it would work injustice, and would not really be justified by the principle itself." (Shelborne, L. C. in *Inman S. S. Co. vs. Bischoff*.)

"One must be careful not to lay the accent upon the word 'proximate' in such a sense as to lose sight of or destroy altogether the idea of cause itself. To treat causa proxima as the cause which is nearest in time is out of the question. The cause which is truly proximate is that which is proximate in efficiency. That efficiency may have been preserved, although other causes may meantime have sprung up, which have yet not destroyed

it, or truly impaired it, and it may culminate in a result of which it still remains the real efficient cause to which the event can be ascribed. Proximate cause is an expression referring to the efficiency as an operating factor upon the result. Where various factors or causes are concurrent, and one has to be selected, the matter is determined as one of fact, and the choice falls upon the one to which may be variously ascribed the qualities of reality, predominance, efficiency. There may be attendant circumstances which may aggravate or possibly precipitate the result, but which are incidents resulting from the injury, or receive from it an operative and disastrous power. The true efficient cause never loses its hold. The result is produced, a result attributable in common language to the casualty as a cause, and this result proximate as well as continuous in its efficiency properly meets the language of the expression 'proximately caused.'" (Lord Shaw in *Leyland Shipping Co. vs. Norwich Union Fire Ins. Society*.)

Mr. Withers then continues:

"Turning to the facts of the 'Albert Watts' we find (1) the vessel was destroyed by fire (*prima facie* a marine risk); (2) the cause of that cause was the accidental ignition by human agency of the gasoline which had formed part of her cargo; (3) the cause of that cause was that the gasoline was leaking from a hole in her side made by a mine or torpedo (i. e., a consequence of hostilities). I submit that the consequences of hostilities was the *sine qua non*, but the *causa proxima* was the marine risk, and that, therefore, the loss should fall on the marine underwriters. Those who contend that the loss was a war risk evidently base their opinion on the nature of the cargo, which, escaping through the hole made by the mine or torpedo, became ignited, a risk to which from its nature it would be peculiarly susceptible. It must, however, not be overlooked that, if in consequence of a war risk, a vessel is more susceptible to, or less capable of resisting, a marine risk, the subsequent loss through marine perils falls on the marine underwriters."

INSURANCE COMPANY

Freights and Disbursements

STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Special Agent
230 BYRNE BUILDING
LOS ANGELES

O. G. ORR & CO., Managers
ATLANTIC MARINE DEPARTMENT
37-43 WALL STREET NEW YORK

AND BRITISH COLUMBIA, 264 COLMAN BUILDING, SEATTLE, WASHINGTON

SALVAGE AWARD

Appellate courts are not, as a rule, prone to disturb awards of a trial court, particularly in cases of salvage, as it is assumed that the trial court has investigated thoroughly all the features of the case and if the decision or the award is fairly reasonable the decision of the first court will stand. For this reason the decision of an appellate court increasing a salvage award as quoted by "Fairplay," is interesting. Note that it is stated that if it had been shown that the salvage tug had been in serious danger a larger award would have been made.

The case is as follows:

There has always been a little difficulty in defining the difference between towage and salvage, and the point has special attention in an appeal which has just been decided at Wellington. It appears that an American barque, when in charge of a pilot, ran ashore at Pencarrow Head, Wellington Harbour, in June, 1917. She was fully loaded with general cargo from the United States, and was on the rocks. The tug "Terrawhiti" went to her assistance and towed her off, but she was so badly damaged that the repairs necessitated an expense of £12,000. The owners of the tug, the Union S. S. Company of New Zealand, were awarded £1,000, and they appealed against this amount. Mr. Justice Sim, in allowing the appeal, thought that due weight had not been given to the value of the property salvaged. The ship, cargo and freight were valued at £142,490, and, even taking the cost of repairs, this left a total of £130,490 as the net value of the property salvaged. The court increased the original award to £2,500, stating that if it had been clear that the "Terrawhiti" was in serious danger when performing the salvage services, they would have been entitled to a larger award, but this had not been made out. At the same time, it cannot be considered that an award of £2,500 under the circumstances was excessive.

MARINE INSURANCE NOTES

The "Canada Maru", recently on the rocks south of Cape Flattery, was a marine disaster justifying the ancient bewilderment of King Solomon relative to the "way of a ship in the midst of the sea."

The steamer, belonging to Osaka Shosen Kaisha,

was on a voyage from the Orient to Tacoma, carrying a cargo of foodstuffs and Oriental merchandise, the value of which ran well into the millions, while the vessel itself added probably another million or a million and a half to the total at risk. She had almost arrived at destination, speaking comparatively, when she went on to the rocks. Presumably a heavy fog and unknown currents were largely responsible for the situation in which she found herself.

Many experienced salvors in the Northwest, having either seen or had described to them the obstacles necessary to be overcome were the vessel to be saved, gave her up as gone. Added to the perils of the rocks and the difficulty of getting close to the steamer, the weather conditions for several days after she struck were particularly bad. Lighters were sent to take such cargo as could be discharged, while anchors were put out and tugs pulled to keep her stern from going on, and thereby making assurance of loss doubly sure. Several of the lighters taking cargo were badly damaged, and one became a total loss.

Fortunately, however, by means of pumps and discharged cargo, the vessel was lightened somewhat, although holds No. 1 and No. 2 were nearly flooded. These facts, together with holding anchors and tugs, plus what some call the chief factor, good luck, brought the vessel off, and she went under tow to Esquimalt, where temporary repairs were effected, thence under her own steam to Seattle and Tacoma.

After the vessel was floated and the whole venture saved from complete destruction, the Japanese captain committed suicide, or better, hari kiri, which ceremony originally was accepted as an atonement for a fault. It is one of the odd traits of human nature when under stress to become introspective and to see a personal fault where none is seen by one's fellows. In all the discussion incident on an accident of this character, there has been no suggestion that it was chargeable to the captain, and yet he himself must have held differently. Possibly he thought in this wise, to quote Kipling—

"Mine at the last—when all is done

It all comes back to me—

The fault that leaves 6000 tons

A log upon the sea."

He was the master of the ship, and as such the responsibility for the venture lay on him. Disaster came, and with a moral courage worthy of emulation—however ill advised it may have been in its result—he neither played fast and loose with his subordinates nor shilly-shallied with his conscience. His vessel was wrecked, and with Oriental philosophy he offered his atonement.

The adjustment of the losses on that portion of the merchandise insured in the Fireman's Fund was to a great extent in the hands of Frank G. Taylor, the company's general agent in Alaska, British Columbia, Oregon and Washington.

THE SEATTLE MARINE INSURANCE EXCHANGE

The marine insurance underwriters and brokers of Seattle have formed an organization known as

the Seattle Marine Insurance Exchange, the main object of which is to safeguard the marine insurance interests in Seattle and to be in a better position to exchange views for mutual benefit. It is the aim of the organization to work in harmony with the Insurance Federation and to express, as a united body, its views in connection with insurance legislation. Thirty firms are represented in its membership.

The officers for the present year are: J. F. Beede, president; B. Hermann, vice-president; Robert O. Fleming, secretary and treasurer. The executive committee is composed of G. L. West, E. H. Hutchison, Harold Lee, C. B. DeMille and H. M. Vogdes.

Freight Report

OUR last report was dated September 20, and there has been very little activity in the freight market.

No time charters have been drawn at all, which is in strange contrast to the business being done in this line as reported from Japan. For instance, five or six steamers have been chartered there lately for twelve months for Japanese coasting trade, at 25 yen. The "Tenkai Maru," about 5000 dead weight, chartered for two round voyages to the Pacific Coast, 38 yen. The "Bushu Maru," 4000 tons, trading limits Japan, Pacific Coast, Mediterranean, 42 yen. These rates are high, although in August one of the Japanese freight reports noted the charter of a 3100-ton steamer for twelve months, with trading limits Japan, India, for delivery at the end of this year, at 63 yen per ton on the dead weight.

Amongst other high charters reported on voyage charters, the "Kotsu Maru," formerly on this coast, was recently chartered to carry dry sugar in bags from two ports on the north coast of Java to the port of Suez, at 500/ per ton, net.

The latest charters for nitrate have been steamer "Northland" to San Francisco at \$21 for immediate loading, and motor boat "Ozmo," with the same sort of cargo, to Honolulu at \$27.50. After discharging nitrate at Honolulu, the "Ozmo" proceeds in ballast to Fiji or Samoa to load copra for San Francisco for Burns, Philp Co., at \$45 per ton.

The French motor boat "General Pau" loads part cargo of rice from Seattle to Cuba at \$22 per ton, remainder of cargo of spruce on the basis of \$27.50 per 1000 feet.

From San Francisco, G. W. McNear, Inc., have chartered schooners "Fearless" and "Albert" to one port New Zealand on the basis of \$1.37½ per case, oil products, with lumber on deck, private terms.

For lumber from the North to the west coast of South America, motor boats are now asking \$45, which rate has been freely paid for the last two or three months, and it looks as if shipowners might have to accept a less rate in order to do business. No doubt, \$43 would be paid by shippers.

The Pacific Export Lumber Company are reported to have chartered motor ship "Louise Bryn" to Buenos Ayres at \$60 per 1000 feet.

The motor ship "City of St. Helens" was chartered by Dant & Russell from Columbia River to Shanghai at \$40.

We understand that two of the Foundation Shipbuilding Company's steamers were chartered during the month to carry coal to Rio de Janeiro, but we have not been able to ascertain the freight rate paid.

In our last we spoke of the sale of the "Joan of Arc," but apparently the sale was not completed. The only actual sales made lately have been those of the American steamer "Benito Jaurez" and British motor boat "Knickerbocker," both going to the Philippines, on private terms.

The Emergency Fleet Corporation has contracted with the Main Iron Works of San Francisco for the construction of seven sea-going tugs for Government service in and around San Francisco harbor. Specifications call for wooden hulls, 150 feet in length, 30 feet moulded beam, 17 feet depth of hold. Power is to be supplied by triple expansion engines of 1,000 H. P. and two Scotch Marine boilers of 1,000 H. P. each, coal burning corrugated furnaces. Equipment includes steam capstan, windlass and steering engines; independent air, feed, wrecking and bilge pumps, electric generating sets and wireless outfit. The Main Iron Works have contracted with W. F. Stone Shipbuilders of Oakland for the construction of the hulls.

For the month ending October 15, the Columbia River Shipbuilding Corporation employed 500 additional men and in another month hopes to increase the strength of its personnel by 2000. The extra help is required by virtue of two new ways being placed in service, making a total of five, and also the operation of a second plate shop and another blacksmith shop.

W. H. and E. Von der Werth, launch and boatbuilders, have obtained authority from the Commission of Public Docks to shift their floating plant to the foot of Woodward avenue. They were compelled to leave moorings at the foot of East Morrison street owing to the space being leased by the Pacific Marine Iron Works for an addition to its fitting out dock.




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34 First St., San Francisco

PLEASE MENTION THE PACIFIC MARINE REVIEW WHEN YOU WRITE

SCIENTIFIC FURNACE BUILDING

Tate-Jones and Company, Inc., of Pittsburgh, have issued a very attractive booklet under the above title. The data contained in this booklet is very instructive and is illustrated with numerous photographs showing different installations of the many types of furnaces they manufacture. In reviewing the history of heat treating furnaces, Tate-Jones and Company, Inc., state that the manufacturers who first bought their heat treating furnaces had simple problems of either tempering or annealing. The discoveries of metallurgists in the field of heat treatment were mostly to be made and but little of what is known now of how metals react to heat had then found its way beyond laboratory walls. The entrance of the Tate-Jones Company into the furnace building field came about as the result of their experience in manufacturing oil and gas burners. They had begun the manufacture of gas burners in 1898. The discovery of oils in the Spindletop field opened up great possibilities for the use of crude petroleum as fuel. Consequently Tate-Jones & Company turned to the study of oils and the design of oil burners.

As the heat treatment of steel began to come into prominence, the company was called upon more and more to furnish burners for "home-made" treating furnaces which were wasteful of fuel and uncertain as to results. It was a natural development for this company to start manufacturing furnaces along lines which its engineering skill and practical experience indicated as most effective.

When heat treatment was in its infancy it was confined almost entirely to the tempering and annealing of tools. No attempt was made to obtain exact temperatures—results were dependent upon the judgment of the operator, who worked by color.

From that starting point the science of metallurgy had its beginnings. As it developed new methods, the Tate-Jones Company was called upon to develop furnaces that would keep pace. Old types and designs were discarded whenever improvements could be made. Every modification in method that called for a modification in the means of heat control or maintenance found its immediate answer in a Tate-Jones furnace.

This change was not flexible enough to result in freak designs, but has always been an orderly and conservative evolution in line with the best metallurgical practice.

A word as to the men who build Tate-Jones furnaces: There is an organization of young men, although a large proportion of the members of the administrative and engineering departments have been with the company for many years. Technical training of a high type is demanded as a matter of course.

And their work is known to the steelmasters of the four quarters of the globe, for Tate-Jones furnaces are used in all of the large steel producing centers. Their performance is uniformly satisfactory wherever they have been installed and no matter what their work, whether tempering or annealing, preparing billets for forging or the more complicated processes of heat treatment, Tate-Jones furnaces are doing it well.

Whenever an order is placed with the Tate-Jones Company for one of their large capacity heat treating furnaces the engineering problems are taken up in conference and threshed out. This is where a dozen years of experience in furnace manufacture count heavily. If, as usually happens, the order merely asks for a furnace which will produce certain heats and handle certain quantities of materials, the most efficient type must be decided upon and worked out.

It is not the province of the Tate-Jones engineers to evolve heat treating formulae—that is for the professional metallurgist who has made it a life study. What they do accomplish is the design and manufacture of a furnace which will function in accord with the metallurgist's directions.

In order to decide what type of furnace will best do the work in hand, the Tate-Jones engineers must consider not only the results to be obtained, but also the way in which they are to be brought about. To that end they take into consideration not only the temperatures to be produced and the size of the pieces to be treated, but also the amount of fuel and time that will be consumed in the process.

One of the most important functions of this department is to secure

results with the greatest economy of time and fuel. Savings effected by these engineers pay for their services many times over. Any manufacturer who is working in the face of time limits will find this feature of Tate-Jones efficiency well worth looking into. Economy of fuel is closely associated with economy of time, and should be figured on the basis of the saving per unit of production. Often expert advice will indicate possible savings that total staggering sums.

There is no guesswork about Tate-Jones findings. Results are always checked in the laboratory under actual working conditions, so that there is never any question as to the practicability of any special features or innovations in design.

In all of the usual heat treating processes—hardening and tempering, heat treating or alloy steels, case hardening, annealing—accurate temperature regulation and control are absolutely essential. In many cases uniformity is necessary, while in others distinct variations must be obtained. To get sure and uniform results, precise temperatures are always needed. In forging furnaces the big problem is to heat most economically.

Before it leaves the plant, every type of Tate-Jones furnace is thoroughly tested. Care is taken to know that the furnace will do what is wanted. Any manufacturer who has a heat treating problem will find the satisfactory solution to be Tate-Jones furnaces.

Furnace building with Tate-Jones & Company, Inc., is as near an exact science as is humanly possible to make it. When one considers that practically every large capacity furnace is designed to meet certain conditions and to produce certain results, it is possible to see why it must be built to order to meet the specific conditions. Work of this sort varies so much that standardization is out of the question. The one thing which is standardized is Tate-Jones quality.

WALLACE H. DOW COMPANY

Wallace H. Dow, for twenty-two years associated with George Dow in the Dow Pump Works, now known as the Dow Pump and Diesel Engine Company, has just opened an independent plant at 140 Howard

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street, San Francisco, where he will specialize on Air Pumps, Compressor Pumps, Pumping Engines, Winches and Windlasses.

Mr. Dow is a native Californian and has had a very extensive experience in his line. In a large degree the success of the Dow Pump and Diesel Engine Company is due to Mr. Wallace H. Dow's engineering ability in laying out their Alameda plant and to his personality in bringing about a helpful co-operation between employee and executive. We predict a large measure of success for this new enterprise.

BABBITT METAL AND ITS USES

By Roy P. Cohn,

Sales Manager, Great Western Smelting & Refining Company, San Francisco.

The history of babbitt metals dates back many years. Isaac Babbitt, the inventor of the recessed box, recognized the need of a bearing metal softer than iron, copper and bronze, the metals then being used for bearings. Tin, copper and antimony were the ingredients which constituted the make-up of the formula of the original babbitt.

First the copper was melted and antimony with a small quantity of tin added. These were kept at a dull red heat, and constantly stirred, until the metals were thoroughly incorporated; later the balance of tin was added thoroughly mixed again, and then cast into ingots. Babbitt's formula was patented and his metal gradually became popular and put into general use.

In a little booklet published by the inventor in 1848, Mr. Babbitt informed the public "that his patent did not consist in the use of soft metals simply, but in the mode of its application and confinement in boxes prepared for the purpose."

Since the original patent expired mechanical conditions have changed and it has become necessary to make a babbitt metal to meet certain requirements. For general run of work a lead base babbitt is satisfactory, but for high speed and heavy duty machinery, where resultant friction and intense heat play a major part, it is necessary to supply a metal qualified to meet this emergency.

In preparing metals it is essential to pay particular attention to the quality of the materials and that the metals will always be homogeneous and uniform. This requires great care and efficiency in the mixing and close adherence to the fine points which only comes after constant study and experimenting, before a metal is turned out that can withstand the strain and endurance of the work it is called upon to do.

If properly handled the use of babbitt metals may be made very simple when babbitting a box. A piece of paper wrapped around the shaft or mandrel will keep the hot metal from chilling and reduce the amount of subsequent scraping. Another important feature is to keep the melting pot and ladle clean and not to pour the metal unless heated to a point when it will slightly char a white pine stick. It is also a good plan to heat a bearing shell before babbitting, as babbitt poured into a cold



New plant of the Wallace H. Dow Company, 140 Howard Street, San Francisco

box will not contract evenly and is apt to make the bearing loose and insecure, besides the grinding force of the shaft will eventually shave off the flakes, which would result in a poor casting. To insure against burns, never pour babbitt into a shell that contains any water, or is not perfectly dry, as many serious accidents have resulted from a failure to observe this rule.

This article mentioned before that there is a metal made to meet all requirements; in this edition let us consider the high-grade anti-friction metal especially adapted for water works, sugar refineries, power plants, dynamos, hydraulic machinery, marine engines, automobiles, and electric railway requirements. Efficiency being a paramount feature enables the Great Western Smelting & Refining Company to turn out a babbitt of superior quality.

XXXX Nickel Babbitt, the last word in babbitt perfection, has been the result of earnest endeavors and years of constant application to the needs of high speed and heavy pressure bearings. A strictly tin base metal, the specific gravity is $33\frac{1}{2}\%$ less than the average babbitt. It has often been said that testimonial letters count for nothing, but to the discerning mind, letters containing concrete information pointing clearly why one metal is preferred to another, only strengthens the confidence of the manufacturers, knowing that their product is appreciated and can help guide the alert mind to a better selection of metal and a consequent reduction in the cost of upkeep. Among the many manufacturers the Great Western Smelting & Refining Company can feel honored to know that such testimonial letters have come to them unsolicited. Their XXXX Nickel Babbitt has survived where others failed and in every part of the world is being used in larger quantities each day.

National Foreign Trade Council, 1 Hanover Square, N. Y.

This volume is a complete report of the proceedings of the convention, including all the addresses, both those prepared in advance and those extempore, and the stenographic report of informal discussions, and banquet speeches. Each delegate to the convention will receive one copy without charge. In order that delegates may obtain any additional copies desired, and that those who were not able to attend the convention, and others who are interested in promoting American foreign trade may obtain copies, a limited edition will be placed on sale.

The Fifth National Foreign Trade Convention was called to consider, first, the part of foreign trade in winning the war, and, second, problems to be solved in meeting after war conditions. Approximately one thousand delegates were in attendance.

Every factor of American foreign trade: agricultural, industrial, commercial, financial and transportation, and every section of the country was represented and there were numerous representatives of our foreign trade from abroad. The convention was thoroughly representative of the foreign business of the Nation. The dominant note of the sessions was the determination of this business to see, first, that the fullest and most loyal support on its part is assured to the great purpose of winning the war, and, second, that due thought and effort are given to preparation for the problems of restored peace. The most comprehensive and authoritative statement of the steps already taken and of the measures and policy necessary to secure the fullest accomplishment of these purposes, and to enable American industry to take its proper place in the world markets will be found in this volume.

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Philadelphia Bronze Foundry Doing Important Propeller Work

The American Manganese Bronze Company of Holmesburg, Pa., well known founders of Spare's Manganese Bronzes, and possibly still better known as manufacturers of both large and small screw propeller wheels, have the distinction of recently delivering the first propeller to Hog Island (on an order of 40) for use on the "B" type ships building there. The propeller referred to is 18 feet 6 inches in diameter, weight 34,000 lbs., and is a good example of the large class of work which this company is able to take care of. In addition to the Hog Island propellers, the American Manganese Bronze Company are turning out other large propellers at a rapid rate for such prominent concerns as Federal Shipbuilding Company, Standard Shipbuilding Corporation, Canadian Vickers, and also for the Emergency Fleet Corporation.

The fact that this concern is capable of turning out propellers from 10 inches to 20 feet in diameter shows the flexibility of their foundry. The prominence of their clientele is in no small measure significant of the class of work which they turn out.

The offices and plant of the American Manganese Bronze Company are located at Holmesburg Junction, on the Pennsylvania Railroad main line between New York and Philadelphia, which renders them excellent shipping facilities. This concern is exceptionally well equipped to handle heavy casting work, having two 15-ton cranes in their main foundry bay, and one 5-ton crane in the melting shop. The metal for the propellers

is melted in a reverberatory furnace, which has a capacity of over 15 tons of metal to a heat. Frequently two heats a day are run, so that their melting capacity in this furnace alone is very heavy. A broad gauge spur runs directly under the main foundry crane, so that shipments are made with the best possible expedition.

The officials of the American Manganese Bronze Company are: James B. Curtis, president; Charles R. Spare, vice president and general manager, and T. H. Addie, secretary and treasurer, the latter gentleman also being in charge of sales.

This company has just issued a circular entitled, "Manganese Bronze—the Legitimate Metal for Propellers." A copy of the same may be secured for the writing.

Facts About Shipbuilding. Published by the Ocean Publishing Company of 25 West 42nd street, New York, and handled in the local territory by King Brothers, 1182 Market street, San Francisco. Price \$1.50. This is one of the first American made books giving to the ship fitter and ship worker valuable information on shipbuilding. It has been written by a practical man and is in simple language. It covers broadly rivets, riveting, rivet spacing, buttlaps, buttstraps, rivets between frames and outside plating, distance from heel of angle to center line of rivet holes, width of attachment angles, breadth of buttlaps, buttstraps and edge laps, with size of rivets, plates, frames, oil and water-tight riveting, single and double riveting, bulkhead liners, beam brackets, water-tight manhole covers

and doors, arrangements of butts, angles, rivets, etc.

Southern Marine Journal is one of the newest magazines issued in the interest of shipbuilding and allied industries. This magazine is published in New Orleans and covers specially the Gulf Coast districts. It is handsomely illustrated and well arranged.

The Marine World. The first number of this new marine monthly has reached us and has proven a well-edited publication, dealing with shipbuilding and marine matters in the vicinity of New York. The Marine World is avowedly published in the interests of the Greater New York district and is edited by Christopher J. Doyle.

George V. W. Ingham, who has been a field representative for the Bryant Electric Company in the central Western territory for several years past, has been appointed Eastern sales manager, with headquarters at the factory, Bridgeport, Conn. Mr. Ingham will direct the sales activities of the company in the territory east of the Allegheny Mountains.

Practical Shipfitting, by S. H. L. D. K. 40 pages, 6 chapters, 12 plates. M. Lindsey, 219 Sunnyvale Ave., Oakland. \$2.00 net. A practical book on the fundamental problems of the ship fitter. The presentation is simple, clear, and concise. The typographical work is excellent. The plates and their explanations cover the type problems as now met in our program of steel shipbuilding. This little book should prove useful to all student fitters.

Ship Furnishers That Give Personal Service



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**STATEMENT OF OWNERSHIP, MANAGEMENT, CIRCULATION, ETC.,
REQUIRED BY THE ACT OF
CONGRESS OF AUG.
24, 1912,**

Of Pacific Marine Review, published monthly at San Francisco, for October 1, 1918.
State of California,
County of San Francisco, ss.

Before me, a notary public in and for the State and county aforesaid, personally appeared B. N. De Rochie, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the Pacific Marine Review, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the said publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, J. S. Hines.
Editor, F. M. Dickie.
Managing Editor, none.
Business Manager, B. N. De Rochie.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.)

J. S. Hines, 88 Plaza Drive, Berkeley, Cal.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state).

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is.....

(This information is required from daily publications only.)

B. N. DeROCHIE,
Business Manager.

Sworn to and subscribed before me this 30th day of September, 1918.

(Seal)
Notary Public in and for the City and County of San Francisco, State of California.
My commission expires February 15, 1919.

Note.—This statement must be made in duplicate and both copies delivered by the publisher to the postmaster, who shall send one copy to the Third Assistant Postmaster General (Division of Classification), Washington, D. C., and retain the other in the files of the post office. The publisher must publish a copy of this statement in the second issue printed next after its filing.

The tallest flag-pole in the world was raised at Camp Lewis on October twelfth, the pole measuring three hundred and forty-six feet from end to end. It was set in a concrete base sunk twelve feet in the earth. Engineers at Camp Lewis took a great interest in the event, as getting this pole into place and hoisting it is considered quite an engineering feat. L. H. Miller, Jr., whose photograph is reproduced herewith, officiated at the impressive ceremonies in honor of the erection of the flag-pole. He was more than proud to

do his bit on this auspicious occasion, as his father, Mr. L. H. Miller, president of the International Spar Company of Seattle, presented this unusual flag-pole to Camp Lewis.

**J. C. AXELSON PROMOTED TO
GENERAL MANAGER OF THE
AXELSON MACHINE CO. OF
LOS ANGELES**

The manufacturing world will learn with great interest the promotion of Jule C. Axelsson to the position of general manager of one of the greatest industrial institutions of the West—the Axelsson Machine Co., manufacturers of high-grade heavy duty lhtaes, oil well pumps, sucker rods and fittings, emery grinders, etc., etc.

The rise of "J. C." is purely the result of the most conscientious effort on his part, extending over a period of many years. He has been "all through the mill" and is capable of filling the job of any and every employe in the great Axelsson plant, whether in the factory, business office or on the road. He is exceedingly well liked by all his employes and with whomsoever he comes in contact. Mr. Axelsson's personality combines efficiency and jollity—a most rare combination, for the average efficiency man is anything but jolly and the "jolly" fellow is anything but efficient.



L. H. Miller, Jr.

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BEDELL ENGINEERING CO.

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as specialists in Marine Refrigeration.



Pacific Machine Shop and Manufacturing Company, Seattle

A brief sketch of J. C. Axelson is interesting: Sixteen years ago he entered the employ of his firm as an apprentice machinist at the munificent salary of three dollars per week. In a year's time he received his first promotion—a raise of **fifty cents** per week. Later he was promoted to head toolmaker, spending fully nine years of the most arduous labor in the shop. Then, he was appointed branch manager of the Taft, Cal., office of the firm, followed two years later by promotion to manager of the Los Angeles sales department. In 1915 he became general sales manager and because of his excellent sales extension work, which began to reach all parts of the world, he won the job of assistant general manager of the Axelson Machine Company in 1917.

After this rigid training, he was appointed general manager on June 1, 1918, and now takes his place with the big manufacturing men of the world—and he is still a very young man. "J. C.'s" conservative advancement is typical of his company's method of business. Just as the new "G. M." was put through the "acid test" before he was considered prepared for his big job, so is every article manufactured in the Axelson plant placed through the most rigid tests before reaching the market. It is this conscientious policy that has transformed the Axelson Machine Co. from a small plant employing some half dozen men to a great modern factory of seven large buildings—one of the most modernly equipped plants on the Pacific Coast.

Axelson heavy duty lathes (16-inch and 18-inch quick change gear) are now famous for their attributes of accuracy and rigidity and Axelson well pumps, etc., are a synonym for the best. Under the leadership of the new chief, the prospects for even a more remarkable growth than in the past are exceedingly bright, for the fame of Axelson products is extending to all parts of the world. "Good Luck to you, 'J. C.," says the manufacturing world and those who know him as the writer does, will agree that he is most certainly deserving.

PACIFIC MACHINE SHOP AND MANUFACTURING COMPANY, SEATTLE

One of Seattle's rapidly expanding and fast driving industries, now devoted almost exclusively to war work in furnishing machinery and equipment for Seattle and Northwestern built ships for the Emergency Fleet Corporation, is the Pacific Machine Shop and Manufacturing Company.

Only a few months ago this now

splendid institution was a comparatively small affair, although always noted for the excellence of its workmanship and quality of product. Then as now Allen Cunningham was the head of the concern, but since the expansion he has been joined by other experienced and capable men formerly associated in the machine manufacturing business. While Mr. Cunningham is president and general manager of the expanded plant, his chief assistant is Mr. G. E. Swett, formerly actively connected with the General Electric Company, and who, in addition to being assistant general manager, is also treasurer of the company. Mr. G. E. Steiner, one of Seattle's most prominent citizens, is secretary of the company.

The plant is located on the Duwamish waterway, a site which not so very long ago was for the most part under water or utilized as a grazing pasture for dairy cattle, but which today is adjacent to one of the busiest industrial districts of the

city. The site embraces three and a half acres, upon which has been constructed one of the most modern manufacturing plants in the West.

The main building is the machine shop, a structure 80 by 150 feet, and is fully equipped with all modern appliances and machinery needed in the manufacturing enterprise. Another structure slightly smaller is the power plant and erecting shop, a building 80 by 100 feet. A fully equipped blacksmith shop and an up-to-date pattern shop closely adjoin the larger buildings.

Among the products of the plant are anchor windlasses, winches, capstans and steering gears. This concern also possesses the American license for the manufacturing of the McTaggart Scott & Co. type of safety telemeter, all of which has been approved by the American Bureau of Shipping, Lloyd's and the Bureau Veritas. In fact, the Pacific Machine Shop and Manufacturing Company manufactures all kinds of steam and electric equipment for steel and wood vessels.

At present the plant is running to full capacity on large contracts for the Emergency Fleet Corporation, embracing the production of steam anchor windlasses, warping winches, cargo winches, steering engines and other apparatus required for Emergency Fleet vessels.

All of the latest safety first appliances have been installed, and the various shops are excellently lighted and ventilated.



Interior view of the plant of the Pacific Machine Shop and Manufacturing Company

The Tilted Turret Lathe

THE Tilted Turret Lathe built by the Wood Turret Machine Company, Brazil, Indiana, embodies several unusual and interesting features and differs in its general design and appearance from the more conventional designs of turret lathes and screw machines. The accompanying illustrations give a very comprehensive and clear idea of these machines.

Fig. 1 shows a sectional view of the No. 4 Friction Geared Head Tilted Turret Lathe. It will be noted that the turret is tilted, which feature allows stock to be passed into or directly through it, coming out at the rear through one of the auxiliary holes in the lower half of the turret, without interfering with a tool in the rear position, making it possible to turn an inch or any length without extension on tools. This construction also permits the turning or threading any length to the full capacity of the machine. When working stock one to three feet long, it can be passed through the turret head instead of through rear of machine. When this method is used, a bar is clamped in the bar feed for a stop.

The Tilted Turret also allows the use of large die heads and turning tools, which is not possible on the conventional design of machine. Fig. 1 shows a No. 4 machine equipped with a 4-inch die head which disposes with the old style chasing bar and gives five times the output. The turret will swing a larger tool than any other machine of double the capacity.

The Tilted Turret also gives greater rigidity for heavy cuts as the strain

on the center bolt is minimized, due to the fact that the tilt of the turret applies part of the thrust directly on the slide, eliminating the tipping which usually occurs with the old-style high turret.

The headstock section shows the liberal proportion of the bearings, and also the self-oiling feature for the spindle bearings, and this, in conjunction with the self-oiling countershaft, which requires oiling only once a year, makes it possible to obtain high speeds for brass work.

The spindle is turned from a solid forging of high grade steel and is heat treated. The bearings are all ground and lapped so as to stand very high speeds. The chuck on the spindle has very short overhand, which makes it extremely rigid for heavy forming operations.

This machine is semi-automatic in action because it is equipped with an automatic bar feed mechanism for automatically feeding the stock through the spindle. This automatic continuous bar feed will feed light brass tubing without injury, or a heavy steel bar. There are four gears and a scroll, which give the power to two rollers, while a second scroll is used to fit the adjusting jaws to the stock. Provision is made on the stock adjusting jaws to take round, square, hexagon, or any other shaped stock that one may desire to use. The same lever (located on the left-hand of the machine), which operates the automatic bar feed, operates the automatic chuck, opening it before the feed is thrown into action when the lever is moved over to the left, and

closing it when the lever is thrown to the right. Thus, one lever controls two operations and at the same time eliminates the danger of trying to roll stock into the machine when it is gripped by the collet.

Fig. No. 2 shows a No. 5 Geared Friction Tilted Turret Lathe with power feed to turret slide and automatic bar feed for stock. The automatic chuck capacity is $1\frac{3}{4}$ inches; swing over the bed 15 inches. It will be noticed that these turret lathes are built low, insuring rigidity under heavy cuts. The turret head and turret slide have wide bearings; the cross slide also has wide bearings and is equipped with a powerful hand cross feed.

Fig. 3 shows turret slide with the turret head removed. Near the turret head is seen the center bolt. The part "E" is a Morse taper, fitting in the turret slide, and is firmly seated with nut "F." The hole through this bolt, for the passage of the work, is plainly seen. The bolt is provided with a ball bearing which seats in the top of the turret head. This can be adjusted to give the head free movement at all times and still hold it firmly. Should the operator neglect to use the binding handle "A" there is no danger of straining the index mechanism. To remove the center bolt from the slide, remove nut "F" and give handle "A" a pull towards you. The principle is the same as removing a lathe center.

The index bushings "G" are made of special steel, hardened and ground

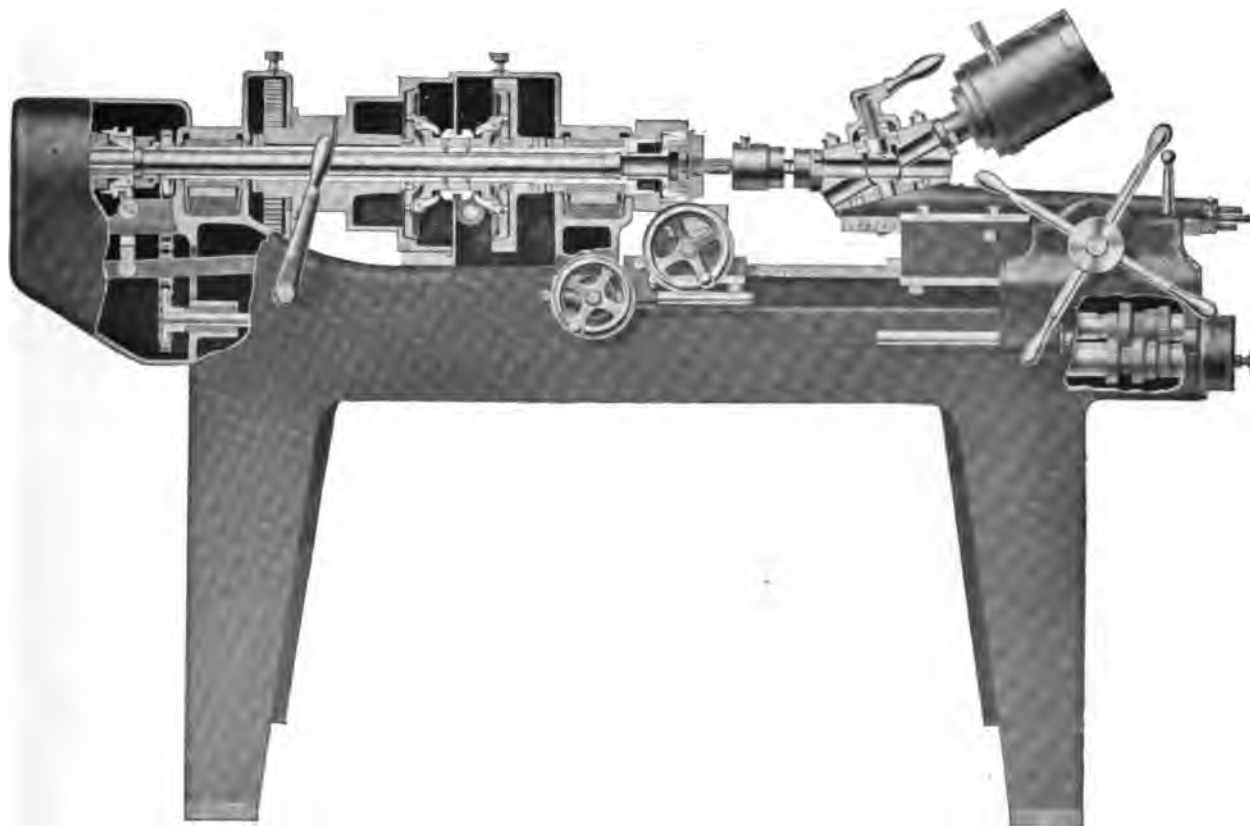


Figure 1

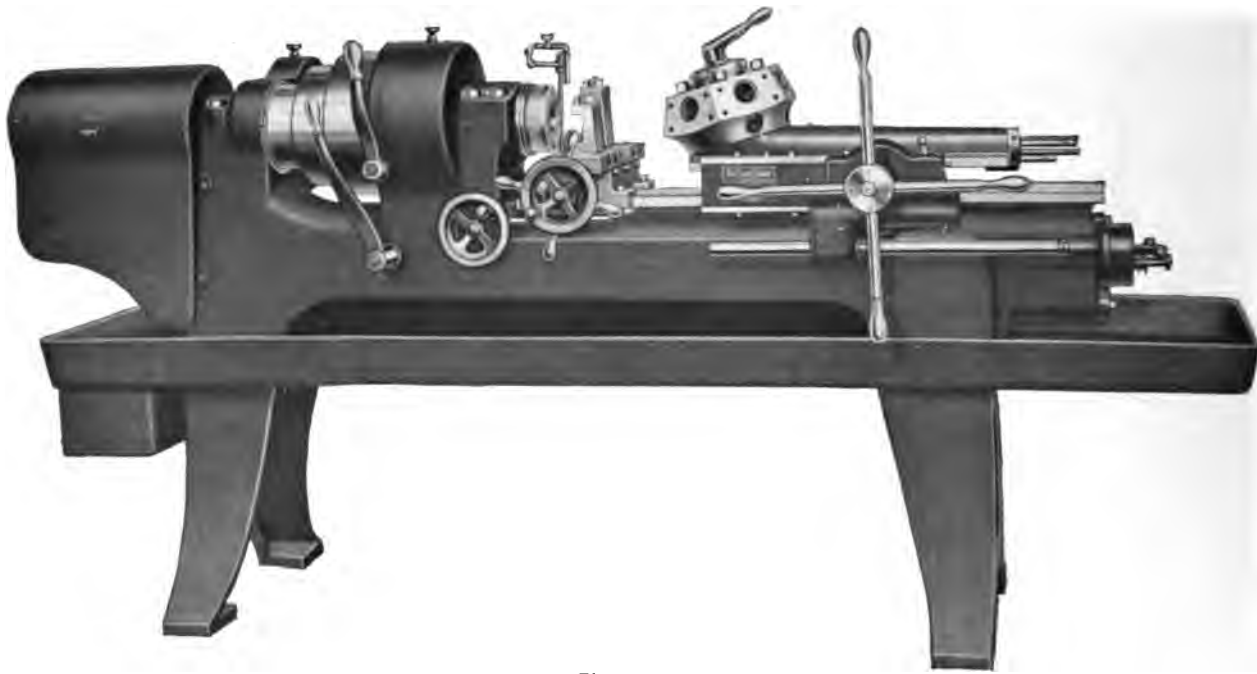


Figure 2

on the outside, then pressed in place in the bottom of the head, and then ground on the inside. The locking pin bushing "K" is also made of special steel, hardened and ground, in the same manner as the index bushings; that is, it is ground on the outside, then pressed into place in the turret slide, and then ground on the inside on special design of grinders. This method of grinding insures a perfect indexing head.

Gear "I" is made of chrome nickel steel and is ground on the outside, then pressed in the head, and then ground on the inside. The "Non-Gran" bronze bushing "D" fits in the bearing of "I," and in case of any wear, all that is necessary is to press the bushing a little further

on the taper of the center bolt. This does not affect the accuracy of the turret head and is a simple way of taking up wear.

Stock may be passed into or through the tilted turret, since the center bolt has a hole directly through it. This feature allows the use of a short, stiff box tool and eliminates the necessity of the box tool rest guide. Thus with this machine it is possible to obtain the benefit of the long, effective motion to the slide. The turret also being hexagon allows the box tool to be bolted to the face, leaving the turret hole open to let the work pass through.

Fig. 4 is an illustration of the slide removed from saddle, showing

the indexing mechanism and adjusting stops. The backward movement of the pilot wheel brings the locking lever "L" over the dial "F," pulling down locking pin "M." Dog "D" engages in sprocket "H," which is made solid with gear "P." "P" meshes into "J" (see Fig. 3), "J" meshing in turn into "I," which causes the head to make one-sixth of a revolution automatically. Locking pin "M" is provided with a positive automatic trip which prevents it from coming in contact with the underside of the turret head until it is ready to snap into the bushing. Danger of damaging the bearing surface of the head is thus avoided.

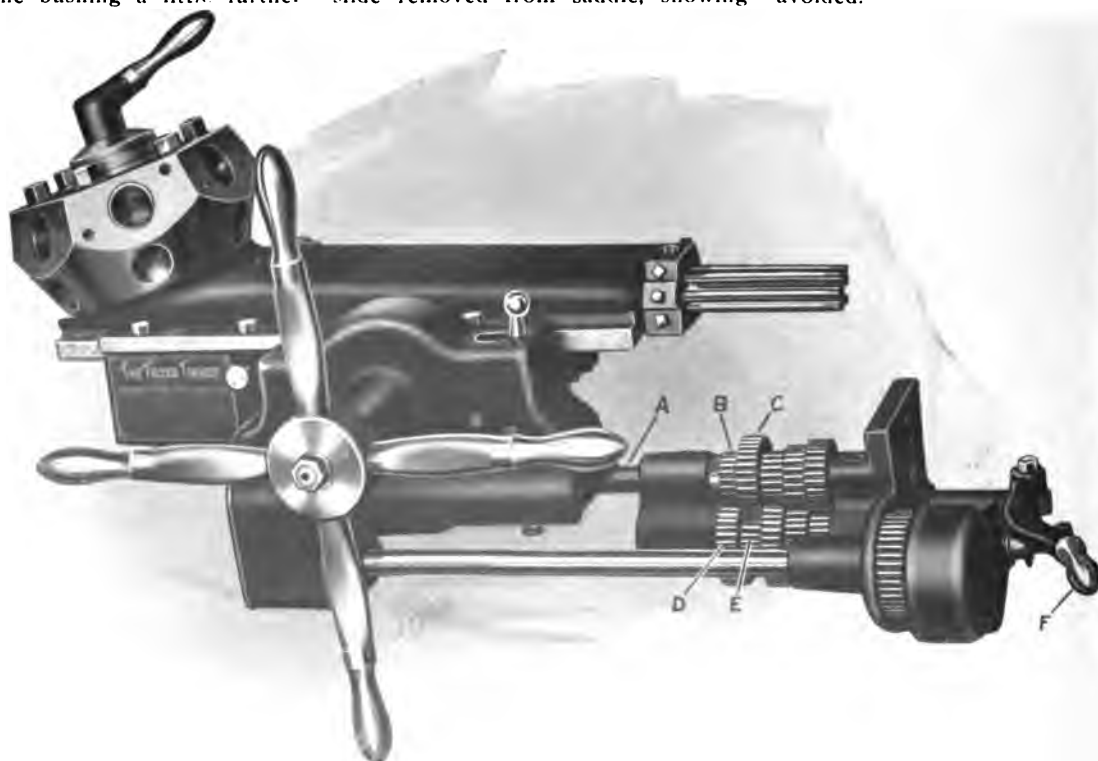


Figure 5

The independent stops to each face of the turret are shown also in Fig. 4. The rods "J" are threaded full length and are revolved one-sixth of a revolution, the same as the head, by gear "I." The ends of the rods are hardened and come against a hardened plunger at "A."

on their shaft. Gears "D" and "E" are also solid and are free to turn on their shaft. The power is therefore transmitted from "B" to "D" and from "E" back to "C." The handle "F" operates a sliding key which engages any one of the three gears mounted on the shaft with

"D" and "E." As these gears are always in mesh with the three that are adjacent to gear "C," three different rates of feed may be obtained. There are in all six changes of automatic feed obtained by doubling feeds. This is done by another conveniently located lever. These automatic feed changes can be made without stopping the machine. The turret slide is equipped with an automatic trip mechanism for the automatic feed, which operates in connection with the automatic stops for each face of the turret.

These machines are built in several sizes for handling bar stock from $\frac{3}{4}$ inch up to 2 inches in diameter. The Wood Turret Machine Company also manufactures Extra Capacity Semi-Automatic Chucking Turret Lathes, with plain head or geared friction head, for handling forgings, brass, steel and iron castings, as well as a complete assortment of efficient turret tool equipment.



Figure 3

The end of "A" at "B" comes against "C," automatically tripping the automatic feed, causing lever "O" to drop forward. This allows the worm to drop out of the worm gear and disengage the feed. The worm gear housing is kept full of oil by filling from a tube on the outside. "G" is an adjusting screw for adjusting dial "F" and causing the locking pin to release early or late as desired. "M" is a taper gib, one on each face of the saddle, to take up any wear on the slide. There is a taper gib underneath each side of the saddle to take up any wear of the spindle, up or down.

Fig. 5 shows details of the geared automatic feed. The necessary reduction in the speed of shaft "A" (which is the one that is connected by chain to the spindle; see Fig. 1) is obtained by means of four gears "B," "C," "D" and "E." Gear "B" is keyed to shaft "A," while gear "C" and the three gears adjacent to it are solid and run free

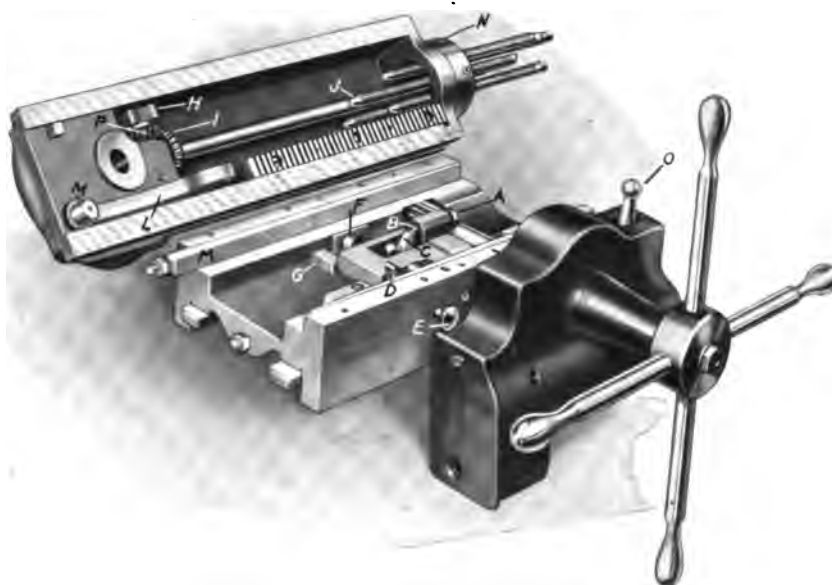


Figure 4

MACHINE TOOLS

In Stock (San Francisco)

Immediate Shipment Following NEW SEMI-AUTOMATIC

WOOD TILTED TURRET LATHES

all with oil pump, pan and piping

2— $\frac{3}{4}$ " Plain Head with auto. chuck and auto. power feed for bar stock.

4—1" Plain Head with auto. chuck and auto. power feed for bar stock.

1—1" Geared Friction Head, power feed to turret slide, auto. chuck and auto. power feed for bar stock.

1—1 $\frac{1}{4}$ " Plain Head, power feed to turret slide, auto. chuck and auto. power feed for bar stock.

5—1 $\frac{1}{2}$ " Geared Friction Head, power feed to turret slide, auto. chuck and auto. power feed for bar stock.

These Are Precision Tools

Ask the User. Write for Catalog.

LOUIS G. HENES

Monadnock Bldg., San Francisco

Title Insurance Bldg., Los Angeles



Large double arch Bement steam hammer at the Forrest Plant



1200-ton United hydraulic forging press at the Forrest Plant

The Forrest Forging Plant

Drawing down a 36-inch steel ingot in one heat to 10-inch diameter is a forging feat new to Pacific Coast steel men, yet this is now everyday work for the big hydraulic press in the new Forrest plant at Fruitvale. The illustration at the upper corner of this page shows this press at work on the upper rudder stock for the Standard Oil Company's tank steamer "Richmond." This is the largest ship forging ever made on the Pacific Coast.

Retiring from active business in 1916, Mr. Edwin Forrest, who had been identified with the machinery and metal working industries of San Francisco for many years, decided to take a long rest in the Hawaiian Islands, but when the United States entered the war he heard the old call and was soon re-established in what rapidly developed into the largest forge plant on the Pacific Coast.

Mr. Forrest's connection with the metal industry in San Francisco covers a period of twenty years, he having been foreman of the old Pacific Rolling Mills and for ten years general foreman of the Risdon Iron and Locomotive Works. This work was varied by his taking charge of the Tajo mines in Rosario, Mexico, for several years.

In building up his latest business venture, Mr. Forrest has made good use of years of experience which taught him that good work and large output went hand in hand with the highest type of shop equipment. In this regard he has been fortunate in securing some very heavy equipment, despite the difficulties encountered in filling requirements in many branches of machine and metal working tools today.

Among the tools to be found in the Edwin Forrest Forge Company's Oakland plant are a 1200-ton hydraulic "United" forging press; 8600-pound, 4000-pound, 2500-pound and two 1500-pound steam hammers; a 1200-pound and a 600-pound Bement

hammer. The steam supply is taken care of by four 100 horsepower boilers, while duplicate sets of hydraulic pumps take care of the presses. An Ingersoll-Rand compressor supplies air for a full assortment of air tools. The main bay of the forge shop is served by a 20-ton steam crane, and there are bracket cranes and hoisting tackle wherever required. There are 16 oil-fired furnaces and the fuel supply for these is stored in two 50,000-gallon oil tanks. The company also has its own water supply drawn

from deep wells on the premises. The present shops, two in number, are 200x100 and 100x100 feet in size. The handling problem through and about the building is taken care of by a system of narrow gauge tracks and cars, which connect with a Southern Pacific Railway spur track, where heavy weights are handled by stiff-legged derricks and steam winches. Water shipments are handled in the same way, the shop being only 200 feet from the Oakland Estuary.



Largest single arch Bement steam hammer on the Pacific Coast



Motor Steamer "JAMES TIMPSON"

Equipped with Two Winton Oil Engines

*This ship is the acme of reliability, economy
and a splendid example of the results of a
Winton installation*

Winton Engine Works

Cleveland, Ohio, U. S. A.

PLEASE MENTION THE PACIFIC MARINE REVIEW WHEN YOU WRITE



Finishing department of the Block Brass Foundry Company

FROM FOREMAN TO PRESIDENT OF THREE FOUNDRIES

From a foremanship in an Alameda machine shop and foundry to the head of a chain of three prosperous iron and brass foundries is the achievement of Peter Block.

Several years ago the Peerless Foundry Company was formed to take over the iron and brass foundry business of the Dow Pump and Diesel Engine Company. Mr. Block was chosen president of the corporation, which is indicative of the high regard his business associates have of his ability as a foundry executive.

Unlike so many newly created concerns, this foundry found an im-

placing this plant to the front rank of foundries on the Pacific Coast in regard to tonnage of metal poured.

With a progressiveness which is characteristic of the man, Mr. Block, in addition to heading the Peerless Foundry, has since organized two other brass foundry plants. One of these plants, the Block Brass Foundry Company, which is located on the Oakland Estuary, is turning out large quantities of brass ship fittings and machinery parts. The illustration shown herewith will indicate the varied assortment of brass fittings produced in this modern plant.

Peter Block is also head of the Pacific Coast Smelting and Refining Company, which is now engaged in turning out a large tonnage of brass steam fittings for use on the cargo carriers under construction for the United States Shipping Board. The above illustration shows one end of the brass moulding room of the Pacific Coast Refining Company.



Mr. Peter Block

ense amount of iron and brass casting work which offered an immediate outlet for their splendid iron and brass moulding facilities. The Dow Pump and Diesel Engine Company turned over all their foundry work to the Peerless foundry, thus

REGO WELDING AND CUTTING APPARATUS

Since the introduction of the oxy-acetylene industry in this country, REGO oxygen, acetylene and hydrogen regulators have been standard equipment on many of the high grade welding and cutting apparatus manufacturers' outfits.

In marketing a complete line of welding and cutting torches, as well as regulators, the Bastian-Blessing Company, manufacturers of this apparatus, offer the result of ten years' active engineering and manufacturing experience in oxy-gas lines and twenty years' in regulator construction.

There are no features in the welding or cutting torches which have not been thoroughly tried out by at least one year's actual service and while there are many new and some exclusive points in the complete line, there are no experiments.

An intimate acquaintance with oxy-gas apparatus has familiarized us with the weak points of equipment and these weak points have been eliminated in REGO apparatus. The fallacies of some accepted claims the industry have been discovered and radical improvements made in the welding and cutting torches.

Mechanically, the manufacturers of this equipment believe the line cannot be better, and that technically it is years ahead of its competitors. But these claims they would like to prove by test rather than because they state them.

The entire line is finished in natural brass. Nickeling or oxidizing is avoided, as these finishes do not wear well and many times are used to cover up mechanical defects, soft solder, etc.

The engineering service at the disposal of the customers of the Bastian-Blessing Company, West Austin Avenue, at La Salle Street, Chicago, is a wide one, comprising ten years' experience in torch construction and use, and twenty years in regulator building, combined with a highly trained mechanical force.



Moulding room of the Pacific Coast Refining Company

CARL W. WEISS—THE DEAN OF OIL ENGINEERS

In 1894 the first practical surface-ignition medium-compression two-cycle oil engine was designed, built and patented by Carl W. Weiss, which is one of the principal reasons why Mr. Weiss is looked upon as the dean of oil engineers.

Mr. Weiss has devoted his efforts almost entirely to the medium-compression surface-ignition two-cycle type of oil engine which is so often termed semi-Diesel motor, but which term is absolutely incorrect and is rapidly being replaced by the term "Weiss Type." Mr. Weiss is a great believer in this type in preference to the true Deisel engine.

Mr. Weiss was born in 1858 and educated in one of the finest technical schools in Holland. In 1876 he visited the Centennial Exposition in Philadelphia, Pa., and for the first time saw there the Otto Langen free-piston type gas engine in operation. During several years following, Mr. Weiss was with the Benton Manufacturing Company in New York City, building experimental models of all descriptions. Among these models might be mentioned Edison's first talking machine, which was sent to the Paris Exposition.

In the early 80's he perfected and manufactured a mechanical register and adding machine for the Check and Adding Machine Company of New York. During this time and several years following, he built a large number of caloric engines, both of the atmospheric and high pressure type.

The register business, including his patents and die casting method, having been sold to the National Cash Register Company of Dayton, Ohio, in 1889, he devoted his entire time to internal combustion engines.

The first Weiss four-cycle type engine was built about this time, and a number were sold in New York City, and several of them are said to be in operation today. In 1894 he completed his first two-cycle type engine, known as the Miedtz & Weiss oil engine. In the small horsepower there were sold in the first few years about 2000 engines. Most of these first engines are in regular service today. The increase in both domestic and export trade kept the factory busy for many years on small and medium sizes.

There have been manufactured and sold about 300,000 horsepower of engines designed by Mr. Weiss and built directly under his supervision in the Mietz & Weiss plant, with which plant he was associated up to three years ago. Approximately three years ago Mr. Weiss severed his connections with the Mietz & Weiss organization and devoted himself to laboratory work, on which he has been concentrated up to the more recent past.

The Weiss Engine Company, with which he became associated three years ago, is now producing the engine developed by Mr. Weiss. These engines incorporate all that Mr. Weiss has learned in thirty years' experience.

Mr. Weiss is a member of the A. S. M. E. (American Association

for the Advancement of Science) and also the Legion of Honor of France, the Motorship League of America, and several other well known technical associations.

COURSE IN INSTRUCTOR TRAINING GIVEN AT SHIPYARDS

Ten men were chosen by the Northwest Steel Company to take the course for shipyard instructors under the direction of the Department of Education and Training of the Emergency Fleet Corporation. The course, which ordinarily takes a minimum of six weeks to complete, was finished by the men at the Northwest Steel yard in thirty-three days.



Mr. Carl W. Weiss

The United States Government, through the Emergency Fleet Corporation, has indeed surprised the world with the results that are being obtained in the production of ships in this country. The course in "instructor training," which may be described as a course in shipyard pedagogy, is accomplishing wonderful results in the different yards. The purpose of the course is not to teach the men anything about their individual trades, but to train them to impart to others the trade knowledge which they themselves already possess. No one but a mechanic can train a mechanic, and no mechanic can properly train others unless he himself is a teacher as well as a mechanic. The developing of capable instructors from men already skilled in shipyard trades is one of the details in Uncle Sam's job of multiplying the man power of his shipyards by ten.

From the instructor's standpoint the teaching of any kind of a lesson consists of four parts. It does not matter whether it is a lesson in astronomy or a lesson in driving rivets. In the first part (preparation) the learner's mind is prepared for the new ideas which are to be put to him, and his attention is di-

rected to the particular thing which he is about to learn. In the second (presentation) the new ideas are given to him by the instructor. In the third (application) he is given something to do in which he applies these new ideas, and in the fourth (testing) he does the same job or a similar job once more without help, thus proving that he has learned the lesson.

The problem of a trade instructor is to analyze, arrange and organize his trade knowledge and to plan his work in such a way that he can "put it over" in the most effective way to the "green" man.

Rothweiler and Company, Seattle, manufacturers of coupling bolts, cap screws, studs, pumps, etc., have adopted a policy of supplying only Pacific Coast yards with their rivet sets and other equipment. All orders received from sources apart from the Pacific Coast are courteously declined, so that Pacific Coast yards may have the advantage of prompt deliveries. This spirit is surely to be admired and is one of the reasons why the Pacific Coast has been able to outstrip the East in the production of tonnage, since the big shipbuilding program has been launched. This "get-together" spirit has accomplished much in the way of speeding up shipbuilding.

TRACTORS IN THE SKINNER AND EDDY YARDS

The lumber tractor just spilled over into the shipyards from the saw mills of the Pacific Coast, but experience is showing the shipyard managers that the little machines are as perfectly adapted to the new work as if designed for it.

Recently the Skinner and Eddy Corporation of Seattle tried out two tractors. These machines had been in service only a few days when Mr. W. H. Borrow, purchasing agent of Skinner and Eddy, called up Mr. E. L. Prescott, sales manager of the Sumner K. Prescott Company, manufacturers of the Prescott tractor, and asked for four additional tractors, stating that they were the greatest appliance for handling that they had ever put into the yard. The six are now in service and giving excellent satisfaction at the Skinner and Eddy plant.

A detachable box body has been built for each of them and the tractor can be used with this body for pulling or pushing loads in the regular way. In fact, the tractors constitute an interior delivery system—speedy, economical and adaptable.

In the saw mills the tractor had come into almost universal use for shifting truck loads from one part of the yard to another. This work was formerly done by horses. The tractors replaced horses, because they do the work of about six horses, on approximately the expenditure for upkeep required by one horse. On top of this saving was the more valuable one, in these times, of releasing six men.

The tractor has proved valuable in the shipyard for the same work that it did in the lumber yards, moving heavy truck loads of lumber and

dragging heavy timbers hither and yon. But its availability for shifting loads of all sorts of materials has become probably even more valuable in the shipyards than its performance of the same character of work that it did in the lumber yards.

For this class of work the Skinner and Eddy Corporation is having the Prescott Company build a trailer for each of the six tractors now in service. Thus two features unknown in the lumber yards have already been added to the tractor under the stimulus of the rush of things in the shipyards—the detachable body and the trailer.

The fact that the detachable body does not interfere with other uses of the tractor has great significance in the shipyards. While the tractor is taking a truck load of lumber to where it is to be used, or picking up a trailer loaded with heavy material and shifting it quickly to where workmen are waiting for it, or soon would be, it can also be carrying a lot of rivets, some nails, paint, brushes, a package of fittings—any little thing that is wanted in a hurry.

One way in which the Skinner and Eddy Corporation is finding the tractors valuable is in the constant extensions that they are making to their yards. In this work the tractor is right at home, in its old field of operations in the saw mills. All the lumber for these extensions, most of it long hauls, is being shifted by the tractors. The reason the tractors are so efficient in this work is that they take each truck load of lumber right to where it is wanted, and do it while a heavy truck would be getting its load aboard. Here, as everywhere else in the shipyard, the small space required by the tractor to make a turn is one tremendous point in its favor.

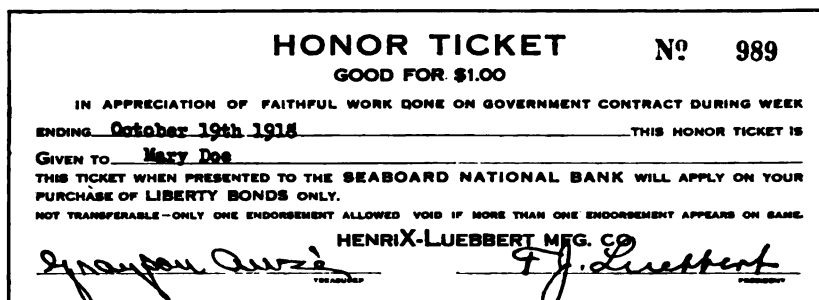
With the detachable body, the tractor has proved far and away the best means of occupying small miscellaneous loads of materials from the store room to a ship. The managers say that in this work the tractor is ten times as fast as any other method that has come to their notice.

The tractor is much used for shoving cars of plates. Here again it has done the work at one-tenth the cost incurred with larger equipment, at the same time releasing the larger and costlier machines for tasks to which they are better adapted.

Skinner and Eddy pronounce the tractor the finest method of which they know for carrying rivets and bolts. In this department the tractor wins both because of its speed and because of the way it can turn corners and get into small places.

To sum it all up, speed is what the shipyards are getting out of the tractors borrowed from saw mill practice, and speed is the thing of all things demanded in the shipyards now. The tractors not only show this speed in their own work, but they generate speed everywhere else.

Mr. B. H. Tripp has been appointed district manager of sales for the Pacific Coast territory of the Chicago Pneumatic Tool Company, succeeding Mr. M. W. Priseler.



A 100 PER CENT LIBERTY BOND WHICH WORKED

Announcement by Henrix-Luebbert Manufacturing Company on the opening morning of the Fourth Liberty Loan drive that each employee had subscribed for bonds was made possible by the patriotic honor system devised by F. J. Luebbert, the president of this firm.

This novel plan which Mr. Luebbert worked out is based upon a weekly bonus or honor ticket which is given each employee showing a perfect time card for the week. The \$1 weekly honor ticket when presented at the Seaboard National Bank applies on the purchase of Liberty Loan Bonds. Thus Mr. Luebbert's firm by means of this patriotic and sensible plan pays \$4.50 to each employee, who in turn adds 50 cents each month for their installment payment for a Liberty Bond.

With the Liberty Loan honor ticket plan and other means, Henrix-Luebbert Manufacturing Company have demonstrated the sound wisdom of co-operating with its employees, which has resulted in putting the firm in the front rank for quantity production and prompt deliveries of canvas goods on Government contracts covering tarpaulins, boat covers, army tents, hatch covers and canvas bunks for troop ships.

OLD CONCERN INCREASES CAPACITY

Colby Engineering Company, who have been in business for a good many years, with offices at Portland and Seattle, have just completed the purchase of the Auto-Marine Machine Works of Tacoma, Wash., and the structural steel shop and fabricating business of the West Coast Steel Company, also at Tacoma. In the past these two plants have been working under contract with the Colby Engineering Company, building the Colby-Samson cranes, mono-rail systems, industrial trailers and the different types of cranes, hoists and the lumber handling systems which this company designs and installs.

The purchase of these plants gives the Colby Engineering Company larger and better shop facilities, and places all under one head.

In purchasing the West Coast Steel Company the Colby Engineering Company takes over all rights, titles and patterns of all cranes built in the past and also take over the stock of steel and the going business and good will of the steel department of the West Coast Steel Company. The old company will still maintain their heavy hardware business.

Recently R. N. Allen, formerly with the Stone & Webster Company

and maintenance engineer for the Port of Seattle, having charge, when with the port, of all mechanical and electrical equipment in their extensive properties, became associated with Mr. Colby in the Colby Engineering Company. Mr. Allen is vice president of the company and supervising engineer, and will have general charge of the shop and field work, as well as supervising, designing and installing their line of equipment. His past experience with the Stone & Webster Company and the Port of Seattle will be of great assistance in his new venture.

This company is now furnishing and installing a number of cranes for shipyards, lumber mills and dock properties, as well as installing a number of their air cooled refuse burners for mills, and they also have large contracts with the Spruce Productive Division.

This news has just come to us and a formal announcement of the new company's plans will be made later. We do know, however, that additional tools have been ordered, and improvements, alterations and additions are being made to the present shop at this time.

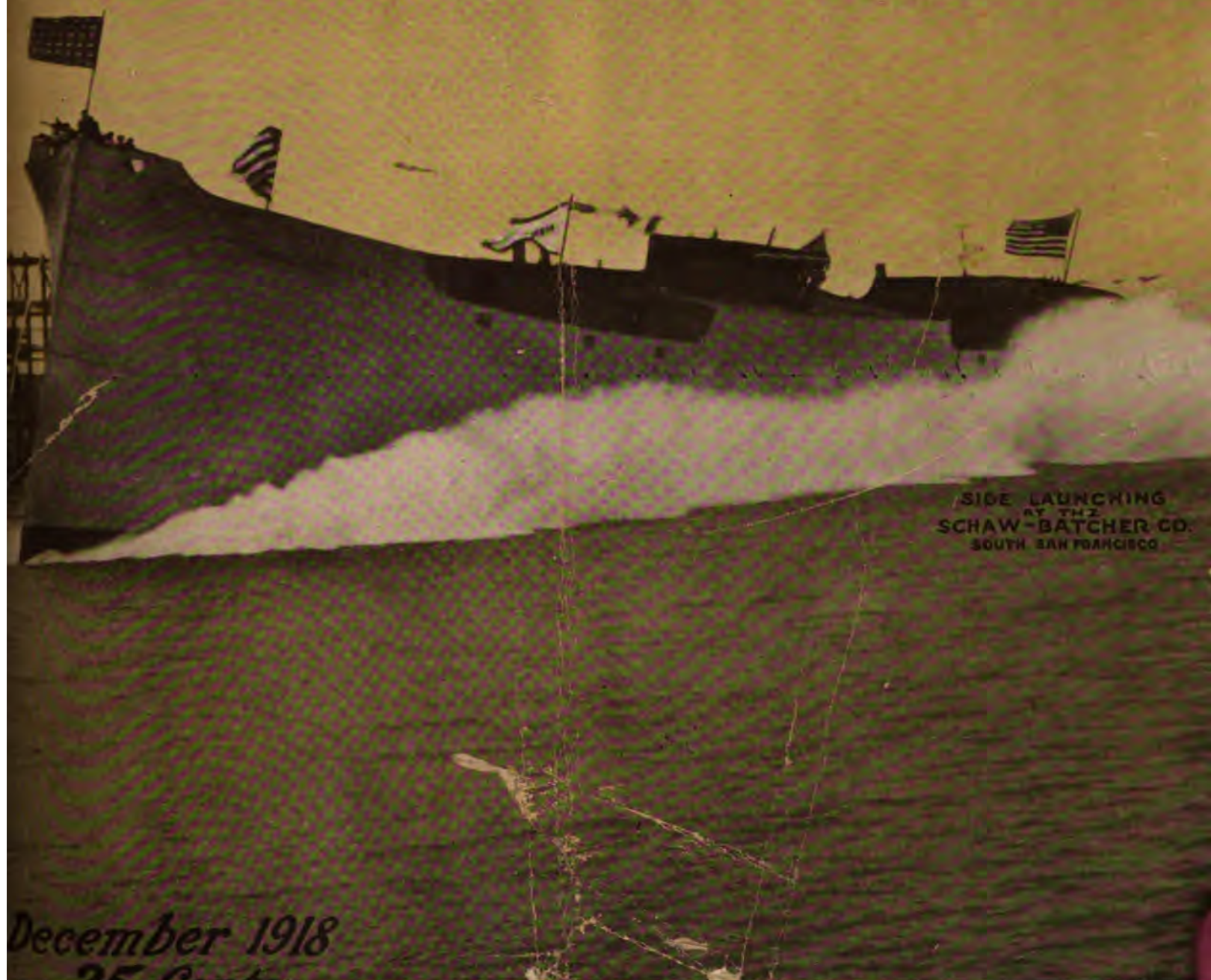
The Colby Engineering Company will still maintain offices at Portland and Seattle, as in the past, while the Tacoma office will be located at 2019 Pacific Avenue.

The new name of the company will be the Colby Steel and Engineering Company.

The Air Reduction Sales Company of 120 Broadway, New York, announce the early completion of its new oxygen factory at 3623 East Marginal Way, near Spokane, Ave., Seattle. The A. M. Castle Company of Washington will continue to act as sales representatives, but all communications should be addressed to the Air Reduction Sales Company at its temporary address, 524 First Ave. South, Seattle. Mr. Harold G. Stern, who has been doing such splendid work with this company, is to act as district manager.

The Shepard Electric Crane and Hoist Company of Montour Falls, N. Y., has appointed Mr. A. J. Barnes as export manager. Mr. Barnes will have his headquarters at Montour Falls and will also continue to be director of publicity. This appointment is another signification of the preparations being made by our different important American manufacturers to get into foreign trade after the cessation of present hostilities.

Pacific Marine Review



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December 1918

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Orders should be issued to everyone in your employ having to do with cylinders, emphasizing the importance of this.

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PACIFIC MARINE REVIEW

December, 1918

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How Shall We Have a Real Merchant Marine?

By Jos J. Slechta

Traffic Manager, Gaston Williams & Wigmore Steamship Corporation

IN a recent formal statement, I committed myself, rashly perhaps, to the prediction that unless one of two alternatives were adopted by the United States in providing for the expeditious employment of the merchant fleet now being created, the Government will be compelled to sell the tonnage acquired in the war emergency, either to individuals in America or to foreigners, for operation under foreign flags. As stated at that time these two alternatives are:

Seldom a wide practical experience and the happy faculty of clear expression combine to such a degree as we find in the author of this article. Joseph J. Slechta has become so noted in this respect that he has been asked by the U. S. Shipping Board to prepare a text-book from steamship operating practice to be used in the schools established by the Board all over this country.

First, we must reconstruct the entire body of our laws which apply to merchant ship operation, and formulate a policy designed to treat shipping as an enterprise wholly unaffected by the economic and industrial factors which control all purely domestic activities. American capital must be allowed to buy or built in such markets as afford the best bargains. Operators must be privileged to hire their labor without restriction from labor organizations or legislation designed to protect them. America may properly control and modify conditions for the employment of labor on American ships, but it cannot control either the economic, or political conditions which affect the operation of competing ships. To attempt to do so would assuredly arouse the enmity of our international friends no less than our enemies.

To further place American tonnage on an equality with foreign vessels in cost of operation, opportunity must be given owners to import free of duty ship's parts and building materials required for both construction and repair. We must go further! When it is apparent that subsidies in whatever guise are offered to foreign owners by their respective governments, thus tending to place American owners at a disadvantage, equivalent subsidies or bonuses must be allowed by this Government to American owners.

This, without amplification of the details involved, is perhaps the ideal alternative, but it is one which I do not believe it possible to adopt. To speak frankly, this nation is committed to a degree of labor unionism which will cause political considerations forever to prevent such a course of action. This applies particularly, of course, to the matter of crews' wages and conditions affecting their services on the high seas.

The second alternative which I have pointed out is this: We must in some way place upon the public exchequer the financial burden of maintaining

ships upon the high seas in competition with owners of foreign vessels whose costs of construction, maintenance and operation will assuredly be less than those to which owners of American tonnage will be subjected.

The Government must determine the difference in cost of maintenance and operation due to higher wages, costlier material and provisions, higher prices for American-built tonnage and other disadvantages beyond the control of owners, and provide the necessary revenue by taxation

to so subsidize American shipping as to place it on at least an approximate equality with the foreign tonnage providing the most severe competition on the world's trade routes.

There will be many who disagree with me in the contention that these two alternatives offer the only avenues open to successful merchant ship operation under the American flag. Probably most of those who disagree will hold that a middle course might be steered by having ownership in the fleets now and in the future to be acquired by the U. S. Shipping Board, remain invested in the Government. I have not given consideration to such an expedient because I do not believe that ocean transportation should become a function of Government. Let us have no illusions upon this subject. There can be no such thing as a dual system of ship operation. If Government is to operate ships, then private operation must cease; I think that there can be no difference of opinion on that score. If the cost of our war fleets is to be amortized, and the vessels turned over to private managers for operation on a commission basis, no regard being given to a return upon the capital investment, it must be obvious that those who still own ships, as private property, must cease to operate them. And do not forget that a not inconsiderable portion of the ships thus far produced by the Shipping Board are ships to which the title remains vested in private hands, they having been contracted for in American yards before the board took the yards over. These fleets of privately owned vessels cannot be operated in competition with the Government, which is not to be concerned with a return upon the capital invested. They will, under such conditions, either be sold to the Government or to foreign interests abroad. They might, of course, be retained as the property of American citizens, if the privilege of transferring registry were granted. It is, for instance, practically certain that after the

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MARITIME LEGISLATION

IN the Pacific Marine Review for April, 1917, there appeared under the caption "A Maritime Congress—Why Not?" the suggestion that suitable delegates be appointed by the Governors of the seaboard and lakeshore States of the Union to form a Congress for the purpose of drafting a constructive programme of maritime legislation.

Early in November, 1918, a prominent Pacific Coast traffic manager urged us to stress this matter again. We therefore had some hundreds of the said editorial printed in pamphlet form and sent to prominent shipowners and operators, marine lawyers and legislators, together with a letter asking for expression of opinion on the advisability of holding such a conference. Response to this effort was unanimously in favor of the suggestion, but much doubt existed as to the possibility of getting the right men interested enough to give time to attend the meetings. In the meantime came November 11, the armistice was signed, the great war over; and the nation, rejoicing in victory, faced the problems of reconstruction.

Sane, sensible, kindly counsel and intelligent co-operation among those interested in the future of American merchant marine operation would be welcomed now by all.

For eighteen months America has been attending a Naval and Mercantile Study Course of great thoroughness and intensity. Millions who never before gave maritime matters a thought have had intimate personal contact with shipbuilding, ship operation, or seafaring life, and we believe that a Maritime Congress at this time could impress its decisions on the mind of the people so strongly as to assure favorable action at Washington.

The danger of delay is all the more evident when we consider the independent and prompt action of union labor in publishing its reconstruction program. And right here we wish to say, without in any way endorsing this program, that the unions are noted for knowing what they want and for co-operation in going after it. This is the secret of their success, and if more union and co-operation was in evidence between ship owners, builders, and operators, there would be less trouble in dealing with union labor and better marine legislation on the books at Washington.

The union labor program demands a tightening of "The Seaman's Bill" and Government control or ownership of all public utilities, including merchant shipping, and makes these demands in no uncertain terms. Much of the published literature of the United States Shipping Board is directed to the preparation of the public mind for that policy, and just now comes Senator Lewis with a resolution to the United States Senate authorizing the Federal Government to acquire, own and operate all railroads, express, telephone and telegraph lines and all coal mines and oil wells, and all merchant shipping, and serving notice that action on this resolution will be forced at the next session, one month hence. Here, surely, is cause enough for an immediate congress of maritime interests; here, opportunity for sane, sensible and kindly counsel; here, need for utmost co-operation.

In connection with any real study of ownership of merchant shipping by the Federal Government, the attitude of the British Government toward British shipping must be taken into account. There is abundant evidence that the liberal government now in power in Great Britain intends to keep control of the merchant marine for a considerable period after peace is declared. In view of this and of the much heralded League of Nations idea, the results of the pending election in Great Britain are awaited with great interest by shipping men the world over.

Says James A. Farrell, chairman of the National Trade Council:

"The progress of the war has been marked by much discussion of proposals for and conditions of a continuation of the contest by economic forces after the military struggle is ended. Our supreme duty is to see to it that the peace terms render impossible the continuance of conditions sought to be corrected or prevented by economic warfare. If the peace is satisfactory, there will be no need for economic warfare. If the peace is not satisfactory, economic warfare will be impossible. It is for us, then, rather to devote our fullest effort now to insuring the enforcement of an adequate, just and final peace. With such a peace we can go forward in confidence to meet and solve the numerous and intricate problems certain to arise from the complex and novel conditions naturally flowing from the cataclysm that has overwhelmed the world during these last four years."

We must realize with finality that the war has wrought the emancipation of countless multitudes of men from mental as well as physical shackles, and that there can no return with safety to our pre-war selfish methods in business. Service will have to take precedence, and the measure of success be written in life rather than in dollars.

Merrie Christmas

Once again after five years of fearful strife, the old glad message "Peace on Earth, Goodwill toward Men" is seen in bright letters of scarlet across the fast disappearing clouds of war. As we look upon this flaming symbolism of Mercy, Justice and Righteousness, we realize that it is washed in the heart's blood of our best and bravest men. Sacrifice bought for us the enjoyment of all that is best in the meaning of Christmas, and sacrifice alone will keep Christmas what it ought to be. The joy of giving is the joy of Christmas. Let us then give of our substance, give of our service, give of our life that the sacrifice which was made for us be not made in vain; that the boys on the sea, and the boys on the Rhine, and the boys at home may know the real measure of free American men. For Freedom has Won and we are not now giving as forced by enemy or circumstance, but giving in a large, broad, free way as free men should. That agency whose symbol is the very sign of sacrifice, and whose work during the past five years has brought the admiration and gratitude of all humanity could present its claims upon us at no more fitting time than at the Christmas season. So let us put over the Red Cross Membership Drive in the free-hearted American manner, and we shall all have a genuine

Merrie Christmas

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war, ships can be operated more cheaply under the Canadian flag than under the American, and I am enough of an internationalist to feel that it would not matter a very great deal if that were to happen.

The nationalization of our ocean transportation system, as a permanent policy, would mean that all considerations of profit or loss would eventually be disregarded, just as they are virtually disregarded in the postal service. But the postal service is internationalized to a very large extent, in so far as mail handled between the different nations is concerned. This is not going to be the case with shipping. Other nations are not going to nationalize their shipping just because America may do so. What would be the result? The Federal Government, as the owner of American ships, would find itself in competition with private owners of foreign ships in all the trade routes of the world. It does not require a very great imagination to foresee humiliating complications and disagreeable situations which would from time to time involve this nation in unpleasant international controversies.

Picture, if you please, the majesty of the Federal Government being called to the bar in a trial before an admiralty court in a foreign country, within whose jurisdiction a cause of action has been brought growing out of a collision between a vessel owned by the American Government and another vessel owned by a private citizen of, let us say, Germany. Again let us examine into the matter of rates. Let it be assumed that the United States is operating fleets aggregating 3000 freight and passenger vessels between American and foreign ports. Such a tonnage, if available after the period of demobilization has passed, would be equivalent to nearly one-third of the probably available total overseas tonnage of the world. Let us assume further that the total tonnage then available will be sufficient to about evenly balance the demand for ocean-borne transportation facilities. Such a balance, it may be explained, is struck when the net profits realized by the operators are approximately equivalent to the average income produced by the capital investments of a nation's general commerce and industry.

When ships earn less than such an average net profit, some owners will lay up the less profitable vessels; builders will produce fewer ships, and old vessels will be junked. This process goes on until the balance is again struck, as between supply and demand, and the earnings are once more equal to or greater than the average national income on investments. Suppose, now, that into this delicate mechanism of economic law there is thrust a controlling factor in the form of an owner of a third of the world's tonnage, who regards with equanimity both profit and loss; who does not count as a factor in the cost of operation the interest upon the capital investment; who builds vessels whether they may be profitably operated or not, and who charges rates commensurate in no certain measure with the laws of supply and demand. How long would it be before the ocean transportation of the whole world had broken down completely?

I do not believe that American steamship men of large capacity and business sagacity are wholly unconscious of the serious portent of the more or less vague insinuations which come from Washington that unless private operators bind themselves to maintain American vessels upon the high seas

in competition with foreign owners, the American Government will nationalize them and maintain their operation regardless of the loss sustained.

What is it that the voices of the considerable financial interests involved in privately owned American ships are nowhere heard in public forum, protesting in their own behalf against the nation-wide propaganda for an American merchant marine, which in no single instance has given evidence of any plan for the operation of American shipping on a basis which will make it possible for ship owners to compete with foreign owners?

Is it possible that none of the American shipping magnates—and the fortunes of war have elevated many American ship owners to the power of magnates, even in these days of multi-millionaires—are cognizant of the situation confronting them in the days when there shall again be sufficient tonnage to move the commerce of the world? Let no one suppose that the hey-day of high rates, on which even the expensively operated vessels may thrive, will long survive the coming of peace. The same factors which operate to strike the balance between supply and demand, as I have said, will quickly bring about a normal level of rates, when once the restraining hands of governments at war are lifted. These facts are well known to experienced shipping men abroad, as well as at home. I challenge any man in this convention to name a single practical steamship man who is competent to speak with authority who can be quoted as expressing the conviction that unless things now unforeseeable intervene, it may confidently be expected that American ships can compete under normal conditions with ships operated under other flags.

Is it because they envisage the humiliation of failure with equanimity that they do not raise their voices in protest? Permit me to answer that question with what may seem like sensationalism, but is really the result of cold-blooded analysis of the facts. There are two classes of ship owners and operators in the United States, who do indeed view the prospects of disappointment with absolute equanimity, and these two classes embrace practically the entire list of shipping men who might be expected to play imposing parts in the drama of America's merchant marine regeneration.

The first class contains those who see no hope whatever, but have already amassed large fortunes from the exigencies of war, and who do not propose to risk these fortunes in the uncertainties of operating American ships against all but insuperable handicaps. They have long ago fully decided that they will get out while the "getting is good," and not a few of them have already liquidated their holdings, wholly or in part. I would also include in this class those who plan to invest capital in ships under foreign flags.

The second class—call this sensational if you will, but withhold judgment until I have finished—embraces those who have sat at the feet of the wizards in shipping affairs on the other side of the Atlantic; they and their satellites know full well the folly of anticipating enlarged powers and financial gain by operating American ships on the high seas, unless conditions are radically modified. These men are in the closest touch with the powers which control the greatest aggregation of ocean tonnage that the world has ever seen. I refer to the well-known amalgamation of the great steamship companies of Great Britain, which now controls abso-

lutely the ownership of a large majority of British tonnage. Not a move is made by the American interests which I have in mind that is not in studied harmony with the magnates back of this amalgamation. Now, be it understood, I have the greatest sympathy with the ambitions of Britain's leaders in shipping, who wish to re-establish their domination of the high seas by replacing their submarine losses with ships built abroad. It would be a magnificent gesture for this nation to say to Great Britain after the war: "Take these ships at a normal pre-war price. Yours were sacrificed in our common cause, and we do not wish to profit by your misfortune." But if it be not the sense of America to lose the opportunity which has been thrust upon her, for flying her flag from the masts of her own ships in all the ports of the world, shall we then deliberately play into the hands of a few selfish individuals—and we are all selfish, but not equally powerful or sagacious—who cold-bloodedly plan to turn our vast tonnage over to similarly powerful and selfish magnates on the other side of the Atlantic?

You ask me how this can be done? Bear in mind that shipping men in the class I have described are convinced of two things: First, that American ships, operated under the restrictions and regulations now in force, cannot be made to pay a living profit to their owners. Second, that these restrictions and regulations will never be modified by the sanction of this people's legislators. Being thus convinced, they feel assured that sooner or later the fleets now being acquired will be transferred to other flags, owing to our inability to meet competition. If our ships are after the war acquired by private interests, it is felt that pressure will be exerted to permit each owner to transfer the flag, while still at least indirectly controlling the vessels. This would frustrate the cheerful design of our magnate friends in class two. But if the encouraging sanction of silence is given to the Government to retain the control of these ships under some plan of federal ownership, our friends feel assured that the enthusiasm of the public for an American merchant marine will some day crack under the strain of heavy taxation. In the meantime it will be the function of their close advisers on the other side to so manipulate tonnage as to cause undue depreciation in tonnage values, and they calmly reckon the consequences of sudden political considerations that will cause the Government's fleet to be sold to the highest bidder, chief among whom will be themselves.

Gentlemen, I have no evidence of such a deep-seated plan. But are there any of you willing to say that it is impossible? What I wish to impress upon you is that such a plan, or any similar, must be made impossible of attainment. This can only be done by causing our representatives at Washington to become imbued with the pre-eminent importance of at once beginning a thorough and scientific study of plans for establishing our merchant marine upon a foundation which will stand the test of economic expediency. To assert that the loss to which the nation may be subjected by Government operation of shipping will be offset by the advantages gained from an immediate control of ocean transportation facilities is merely enthusiastic conjecture. All such advantages may be easily attained by enacting legislation which will make it impossible for foreign owners to form combina-

tions in restraint of trade, and apply restraining influences of such combinations to the traffic to or from American ports. If this is done, American exporters or ship operators will be enabled to charter foreign vessels for trade on any route, and secure for themselves and for American foreign trade all the advantages of shipping operated under our own flag.

Shipping supremacy is a splendid national achievement, but it must be established upon sound economic foundations, the basis of which can only be profit. Never was there a more misleading slogan hit upon than that of "trade follows the flag." There is only one thing that trade follows, and that is profit, and the flag follows both. A share in the domination of the high seas, so far as trade and profit are concerned, is an end in itself and not the means to an end. Little Belgium had no merchant marine worth mentioning, but she had the greatest per capita foreign trade of any country in the world. Norway and Sweden have had more shipping than any other countries of their population and wealth, but their foreign trade was insignificant. Germany, in the days before she went mad, had a faster growing foreign trade than any other nation in the world, yet more of her products were shipped in foreign bottoms than in her own.

A merchant marine that cannot at least pay for its keep is not worth having. I am sufficiently convinced of the broad-mindedness of American manufacturers now engaging or wishing to engage in overseas trade to believe that they do not wish to extend their markets abroad with the help of subsidies; and it must be borne in mind that if we are to maintain American shipping on a large scale, as an adjunct to our foreign trade, it must be done without hot-house nursery methods.

I am constrained to say that I am not among those who would have this nation pursue a policy calculated to gain a selfish advantage from the war, to the detriment of other nations. In spite of the fact that war has emphasized, inordinately perhaps, the spirit of nationality among all people, higher enlightenment must recognize the fact that if the great sacrifices of this struggle shall not have been in vain, the world must plan a new economic order in the realm of international intercourse. If the world is to remain an armed camp, with powerful nations ready to grasp every opportunity to increase their economic power at the expense of each other and of weaker nations, then indeed the retention of national marine power is indispensable, no matter what the cost.

But if the successful settlement of the issues now involved brings with it the dawning of a new and better era in international affairs, no nation so well as America can afford to let those peoples supply without hindrance such services and such goods as they are able to provide most cheaply and most readily, under quality of circumstances. Such a policy may well add to the sum total of human happiness in all the world and would assure the impossibility of future wars, as nothing else can.

The Program Committee of the American Manufacturers Export Association has asked me to make recommendations for the establishment of a sound policy looking to the perpetuation of our now fast growing merchant marine strength.

The policy which I can conscientiously recommend must be one based upon the two alternatives

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PACIFIC MACHINERY

The Scotch Boiler Shop of the Moore Shipbuilding Company

THE new Scotch boiler shop of the Moore Shipbuilding Company was put in operation on September 30, 1918, and is now rapidly forging ahead on the manufacture of large Scotch boilers. The shop is the largest and most completely equipped plant of its kind on the Pacific Coast.

The main building is a steel frame structure, with saw-tooth roof covering a floor space 350 feet long by 110 feet wide. This space is divided into two bays, one 50 feet wide, devoted to flanging and fabrication work; the other, 60 feet wide, used for erection. Alongside this main building is a lean-to structure 40 feet by 250 feet, used for housing the office, laying-off room and hydraulic pumps.

For heavy erecting duty a very fine 50-ton Shaw electric bridge crane is installed with an auxiliary 10-ton crane for lighter work. These cranes have a clear lifting range of forty feet from floor to hook. In the fabricating bay there is a 10-ton electric bridge crane, and all the heavier tools are provided with hydraulic jib cranes, of the type perfected by the late G. W. Dickie, which has proved so successful in this class of work.

For delivery of material to, and carriage of completed boilers from, the shop, railroad tracks are laid in from the south end and west side of the building, the tracks intersecting under the main bay, where the large crane can transfer loads from one track to the other, and boilers may be taken out of either the end or side of the shop.

At the south end of the fabricating bay a group of machines manufactures the stay and lift bolts for the boilers; machine saws for cutting the rods into suitable lengths; threading and cutting machines of the Landes type for stay rods, stay tubes, and stay bolts; and a fine six-spindle press for drilling the stay bolts, installed by Manning, Maxwell & Moore. In this corner of the shop there is also located a set of horizontal rolls which will take a half inch plate 15 feet long. These are used for rolling plates for steel masts. A 100-inch gap stationary pneumatic riveter takes care of mast, pipe and steel tank riveting. The group of punches includes two horizontal punches with a range up to one and a quarter inch hole in one-inch steel plates, two 48-inch gap punches with capacity for a four-inch hole in three quarter inch plate, and one 60-inch gap punch. For cutting and sizing plates, one steel splitting shear for five-eight-inch plate, one rotary bevel shear for one-inch plate, and a plate planer with 30-foot gap are used.

Oil-burning flange forges of special design for heating the edges of the circular head plates were built by the Moore Shipbuilding Company, and installed close to the steam hammer and the flanging

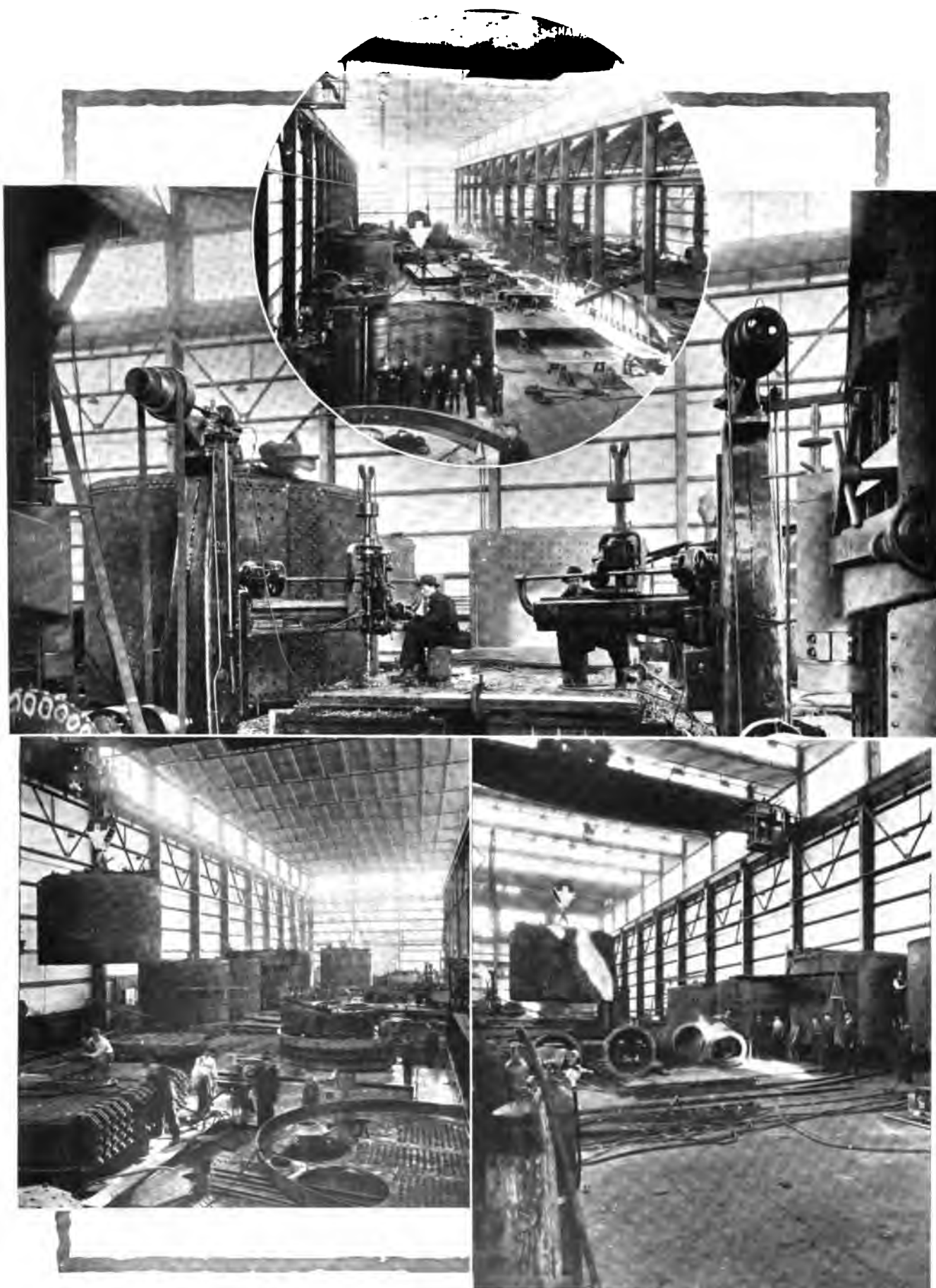
machines. The steam hammer is used for scarfing plate ends, and has 800 pounds capacity. Two hydraulic sectional flanging machines are used of 200 tons capacity each. The head plates, after being flanged, are put into a big oil-burning furnace of Moore Shipbuilding Company design, and thoroughly annealed. This furnace will take plates up to 12 feet in width by 20 feet in length.

For working flat plates, eight radial drills are planned. Four Bausch drills are now in operation, each with 7-foot 6-inch radial arm, working over movable tables. Four drills of similar type are being made by the Moore Shipbuilding Company. A set of large bending rolls, with power sufficient to roll 2¼-inch steel plate into a half circle, and the outer roll of which weighs 15 tons, is used for bending flat plate to the circular boiler side shape. In the northeast corner of the shop are the hydraulic machines for riveting the butt and strap joints on the boiler shell. There are two of these—the larger, shown in our illustration, has 150 tons pressure at the driving head and 14-foot 6-inch gap; the smaller has 100-ton pressure at the driving head, and 10-foot gap. Each has water-cooled riveting surfaces, and a specially designed oil furnace for heating rivets. Each is served by a 25-ton bridge type Cyclops electric crane, controlled by the riveter from the platform at the hydraulic riveting head.

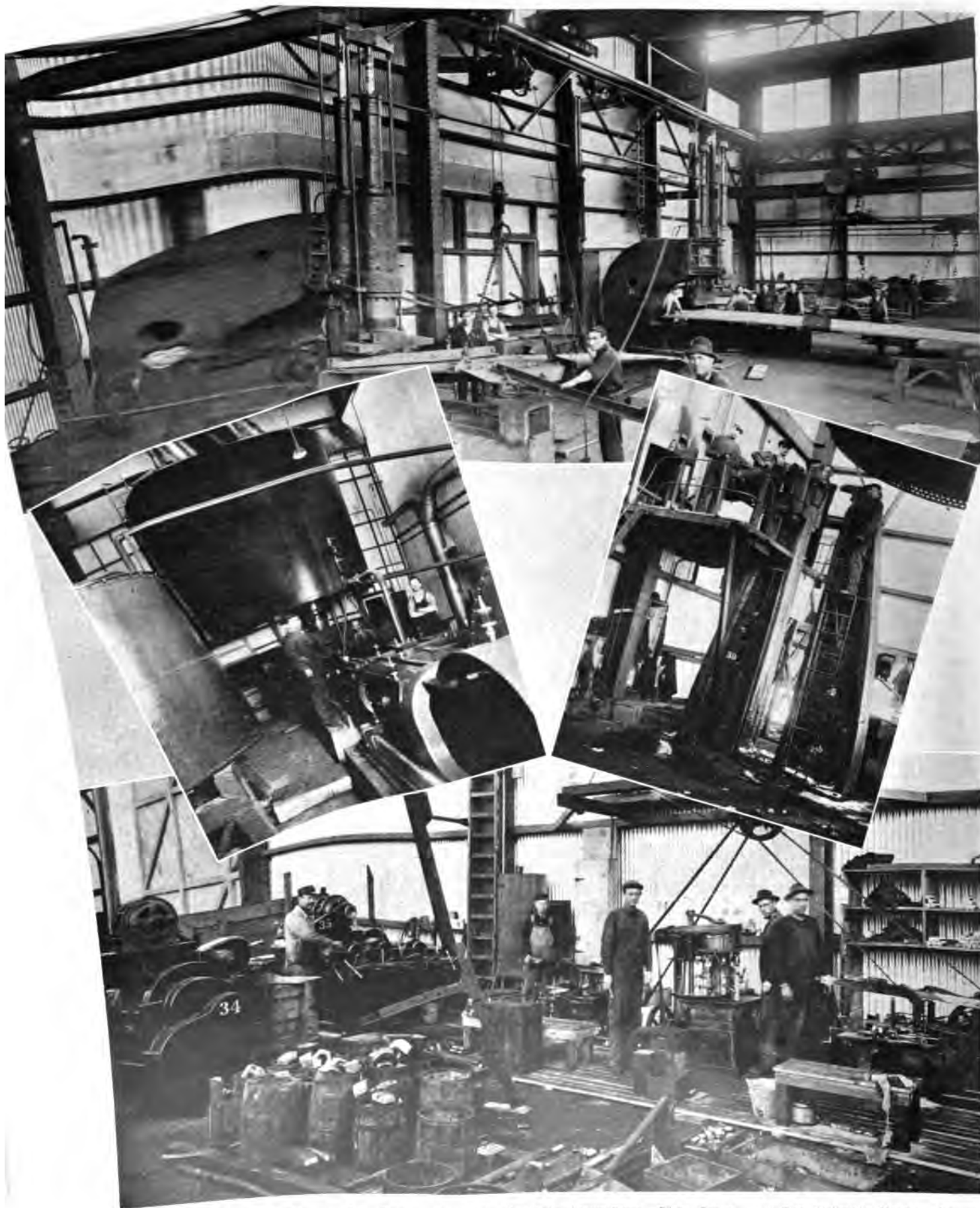
All the machine tools in the shop are driven by electric motors, except where hydraulic pressure is used. Hydraulic pressure is maintained at 1600 pounds to the square inch by a very simple and ingenious automatic hydro-electric control. The installation consists of a 200-horsepower 440-volt motor directly connected to a pressure pump. This pump discharges through a weighted hydraulic ram to a pressure tank. When through use of water the weight on ram plunger has dropped to a point one foot from the floor, it closes an electric circuit which controls the starting switch of the motor. When by the work of the pump the ram plunger has lifted the weight to a given height, the motor is automatically stopped. The weight carried by the plunger is 170 tons.

The Moore Shipbuilding Company contracts call for the manufacture of 150 Scotch boilers for 210 pounds steam pressure in two sizes—14 feet 9 inches, and 15 feet 2 inches diameter.

Quality and thoroughness, rather than speed, are being sought in the production of these boilers. Fifteen are now (November 20) well under way in about forty working days—a fact which speaks volumes for the efficiency of the equipment and the executive ability of the superintendent.



Insert: View of Erecting Bay showing large Bending Rolls and Plate Planer. Upper: Baush Radial Drills in action. Lower: Two views showing Boilers in erection and Bridge Crane



Upper: Hydraulic Flanging Presses. Left Center: Automatic Hydraulic Accumulator. Right Center: 150 Ton Hydraulic Riveter. Lower: Group of Machines for Cutting, Threading and Drilling Stay Bolts in the new Boiler Shop of the Moore Shipbuilding Company

Filtered Oil From a Peterson Filter as Good as New Oil

MANY engineers believe that oil has a faculty of "wearing out", and that after once having been used in a bearing, some of its lubricating properties are destroyed. To ascertain whether there is any foundation for such a belief we recently had some tests made at the laboratories of Cornell University on oil secured from our Central Oiling and Filtering System in the power plant of the Hotel McAlpin, New York City, where the conditions are very severe. This plant operates twenty-four hours per day, three hundred and sixty-five days per year, and the average temperature in the engine room is over 100 degrees F. On account of the great variety of machines lubricated, the high load factor and the exceptional conditions, the work imposed on this lubricating system is probably as severe as can be found in any power plant. This oiling system supplies flooded lubrication to four Wetherill engines, two Clayton compressors and one Wetherill crank-and-fly-wheel pump, there being a total of one hundred and thirty four points of lubrication supplied by this system.

The average amount of oil circulated by the lubricating system is one hundred and fifty gallons per hour, or about 1800 barrels per month. It is interesting to note that although this enormous amount of oil is supplied continuously to the bearings, it is only necessary for this plant to add to the system three barrels of oil per month, but even these three barrels cannot be charged to natural shrinkage in the system, for a considerable quantity of oil is drawn from the filters and used for hand oiling of small pumps, valve gears, etc. But even charging three barrels against this system it is evident that this plant pays for less than two-tenths of one per cent of the oil used for lubrication.

To determine the changes undergone by the oil, a sample of new oil as received in barrels from the manufacturers was tested and also a sample of oil drawn from the clean oil compartment of the filters.

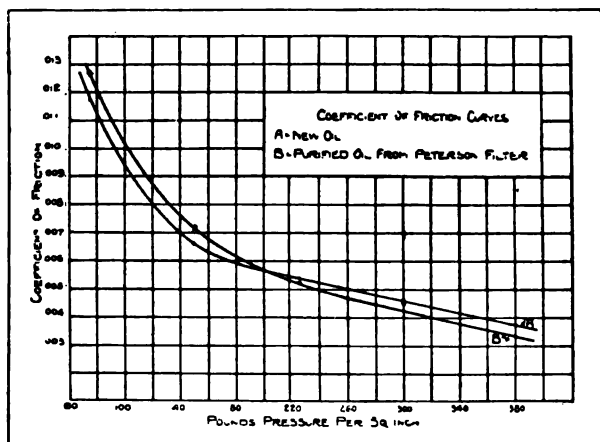


Fig. 5

A series of friction tests were made on a Thurston railroad lubricant tester. The testing machine was run at a constant speed of about 360 R. P. M. and the load applied in increments of 75 pounds pressure per square inch. The test at each load was continued until the friction and temperature

of the bearings had become constant. The oil was fed upon the side of the bearings through a sight feed oiler and the feed maintained as nearly constant as possible throughout all the tests. Readings of the co-efficient of friction and of the temperature of the bearing were made at ten-minute intervals. The results of these tests are shown in the curves in Figures 5 and 6. Figure 6 shows the rise in temperature—that is, the difference between the temperature of the bearing and of the room.

The curves shown in Fig. 6 are the ones that will probably prove the most interesting to the operating engineer, for he is accustomed to judge the quality of any oil and its suitability to his re-

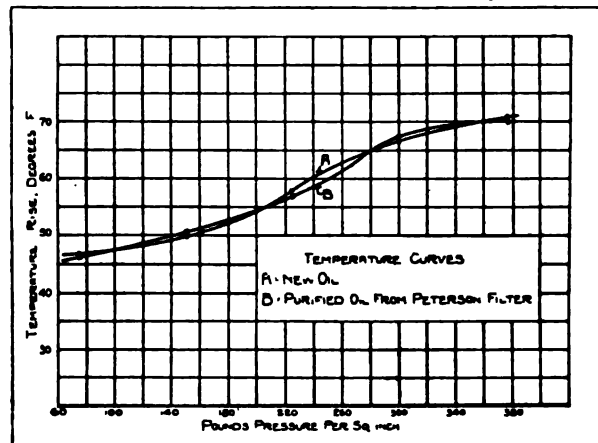


Fig. 6

quirements by the temperature of the bearings, and after all this is a very reliable method because whatever power is wasted in friction is converted into heat, which manifests itself by a rise in the temperature of the bearing. It will be noted that the two curves in Fig. 6 are practically superimposed and in no case is the variation more than a few degrees, giving ample proof that the lubricating quality of the old oil is practically unimpaired.

As mentioned above, about three barrels of new oil are added to this system per month. However, at the time the samples were obtained the system as a whole had been in operation for over a year and a half, and the question naturally arises, What physical changes, if any, did the oil undergo during this extended period?

The results of the tests made to determine these changes were as follows:

Sample "A"—New Oil

Color—medium red, translucent.

Flash point—410 degrees (open cup).

Burning point—460 degrees F. (open cup).

Specific gravity at 60 degrees F. water as 1.895.

Sample "B"—Purified Oil from Peterson Filter

Color—very dark red, opaque.

Flash point—410 degrees F. (open cup).

Burning point—440 degrees F. (open cup).

Specific gravity at 60 degrees F. water as 1.903.

Tests of the new and filtered oil were also made in an Olsen viscosimeter. The results of these tests are shown in Fig. 7, the viscosity being the ratio of the length of time that it takes a sample of oil to flow through the viscosimeter orifice compared

length of time required for an equal volume of water at 60 degrees F. to flow out. From the data it is evident that oil gains in specific gravity through constant use. This is what we would naturally expect, inasmuch as the oil in the bearings has had some of its volatile constituents driven off. Also a small quantity of cylinder oil, used for lubricating the piston rods and stuffing boxes, naturally finds its way into the oiling system. The viscosity curves also show that as oil is used over and over again

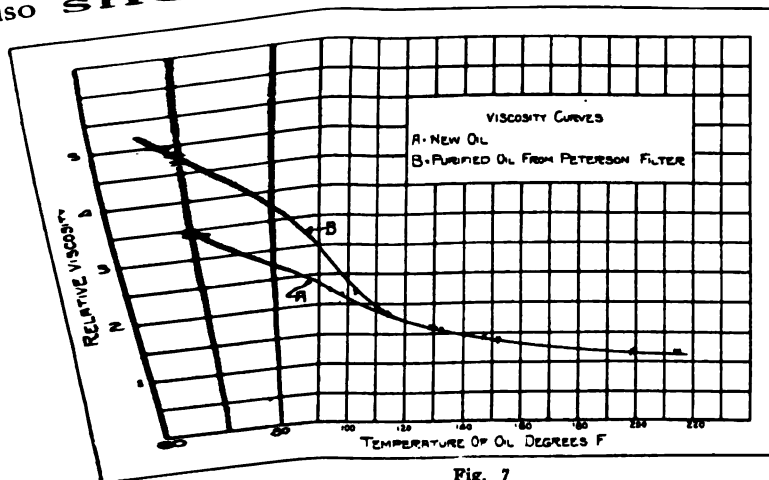


Fig. 7

in an oiling system it actually gains in body, provided a filter is used which thoroughly removes entrained water.

The results of the friction tests as shown in Fig. 5 are consistent with these physical changes. The

fact that the new oil has a slightly lower co-efficient of friction on low bearing pressure while the purified oil shows a lower co-efficient on higher bearing pressures is due to the fact that the old oil, having more body, is better able to maintain a lubricating film when subjected to higher pressures. The difference between the temperature and co-efficient of friction curves of the new and used oil is so slight that, without any fear of contradiction, one can say that for all practical purposes, properly-filtered oil is as good a lubricant as new oil.

It is needless to say that such remarkable results as these can only be secured when an extremely efficient filter is used, one that thoroughly removes every drop of entrained water and one that by a suitable precipitation and filtration process removes all particles of foreign matter. As far as we know, no other type of oil filter has ever shown such a remarkable efficiency when subjected to a thorough and scientific test.

The fact that a power plant like that in the Hotel McAlpin only pays for less than two-tenths of one per cent of the amount of oil used and that the oil can be purified in a commercial filter and returned to the bearings over and over again in a state of purity equal to new oil, is certainly of vast importance in the economical operation of power plants.

As a matter of fact, this plant uses two thousand dollars worth of oil every month, which really costs them nothing, and it is safe to say that the saving in power due to flooded lubrication and the reduction in wear and tear on the machinery is of equal value to the saving in oil.

(Continued from page 73)

stated at the outset of this paper, and upon the considerations which I have outlined. Government operation, under any guise or modified form, is unthinkable, as it is inexpedient and injudicious. The first alternative suggested will not admit of serious consideration for reasons political. The second alternative involves the payment of such heavy subsidies and consequent taxation of the people as a whole in the immediate interest of a few that it also is of doubtful expediency.

There remains only the adoption of the least objectionable features of each. They may be outlined somewhat as follows:

First: Legislation on the subject of ship's officers and crew shall be modified to the end that all officers must be Americans, or declarants for citizenship, and one-fourth of the crew carried on each vessel must meet the same qualification. Three-fourths of the crew carried may be employed by the owner where he pleases and at such wages as he pleases, without interference from labor organizations or legislation designed to advance their interests. This will assure opportunity for young Americans to adopt the seafaring life, with good chances for advancement. Their pay must inevitably be in keeping with wages and salaries in shore industry. To the objection that two scales of wages cannot expeditiously be maintained, there is the answer that the one-fourth American crew would comprise only the higher grades of seamen, such as quarter-masters, boatswains, carpenters, donkeymen, boss firemen and others whose wages would in any case not be subject to the scale of the rank and file.

Second: All supplies, materials, provisions, spare parts, and goods of whatever description, designed for use in the construction, maintenance and operation of American ships, must be imported free of duty. This will place not only American operators but American builders upon an even basis with foreigners, so far as these items are concerned. This is a feature quite indispensable if American registry is to be given to only American-built ships.

Third: A permanent Federal Commission, which may well be the Shipping Board, or its successor, must be provided for, whose function it shall be to determine the amount of extra expense incurred by the owners in employing all American officers and a fourth American crew, as compared with the cost of operating vessels under the registry of our closest competitors. This difference in wages and salaries must be met by a special congressional appropriation.

Fourth: Whenever it shall become apparent that any foreign nation provides a subsidy in any form to owners of its merchant ships, thus placing American owners at a disadvantage in world trading, Congress must afford American owners an equivalent subsidy.

It may be noted that these four features of the policy are the embodiment of several compromises. Their adoption will require some sacrifice of principle or selfish interest on the part of, first, the laboring classes and their organizations; second, the manufacturing industries having to do with ship materials; and, third, the general public, which is naturally averse to the payment of funds out of the public exchequer, and intended for the benefit of a special industry or business.

Our American Merchant Marine and Its After-War Maintenance

SOME of the snags our newly created Merchant Marine will strike in after-war normal international competition were brought out by the writer in the November number of the "Pacific Marine Review," and Government aid by an annual marine tax (or give it any name you please) was advocated. This article is an attempt to show more in detail the necessity for some aid to the prospective American "deep sea" or "off-shore" shipowner.

The three main handicaps set forth in that article were, first, the high initial cost of an American ship compared with that of a foreign built ship; second, the higher cost of operation; and third, our high standard of living cost, and it was stated that until these handicaps were overcome aid was necessary.

It struck the writer after the completion of that article, that perhaps the general public would want to know whether other governments extended aid to their shipping, and if so, what those aids are. Yes, with all the advantages competing nations have had over our merchant marine, their governments still thought it necessary to extend further aid. Statistics, before the war, from "Ocean Shipping," published by the International Foreign Trade Council, show this aid to have been as follows:

Austria

Austrian subsidies appear to be on a very liberal scale; the "working subsidy" for new steamers being from 5s to 8s 4d per gross ton for the first four years, reducing by 5 per cent per annum from the fourth to the tenth year, and 10 per cent per annum afterwards, while a "voyage subsidy" is also granted of 1d per ton of the net tonnage for every 100 sea miles. In addition to the above a shipbuilding subsidy is granted, when at least 50 per cent of home-produced material is ordered, of £1 13s 4d per gross ton for the hull, and 6s 8d per 100 kilos for the engines, boilers, etc.

Belgium

In Belgium loans at 3 per cent have been granted to Belgian shipping companies, but the mail steamers being owned by the government no postal subsidies are granted. With the line to the Congo there is an undertaking by the ministry of the colonies to use the company's steamers for the carriage of all government stores and officials.

Brazil

In Brazil the principal subsidized company is the Lloyd-Brazileiro. This is by far the greatest shipping concern in the country and is closely connected with the government.

France

From 1881, when the first French law for the encouragement of the mercantile marine was enacted, to 1893, the French government expended no less than £3,641,600 in navigation bounties, and £1,266,320 in construction bounties, while from 1893 (when the bounties were increased) to 1901, £4,171,040 was paid in navigation bounties and £1,870,232 in shipbuilding bounties. In 1901 the

This is the second article of a series being written by a prominent local traffic manager for the "Pacific Marine Review." This article shows conclusively that in competition with foreign shipping, the American owner registered under the American flag and subject to the maritime laws of the United States labors under a very decided disadvantage. In a future article the author will suggest some changes in our maritime laws which his experience has shown to be necessary.

results were considered unsatisfactory and the law was altered. From 1901 to 1911, inclusive, £3,977,960 has been expended in construction bounties, £11,652,280 in navigation bounties, while in addition £11,632,859 has been paid for postal services, or an average approaching two and one-half millions sterling per annum. France also restricts its trade to Algeria, enabling the transportation companies engaged in that trade to obtain considerably higher rates than would otherwise be possible, which is in itself a form of subsidy affording exclusive advantages to the carriers.

Great Britain

It has always been denied by British writers on shipping topics that the British government paid subsidies for commercial purposes, all payments to steamship companies being purely for the conveyance of the mail. Some years ago the Admiralty paid certain steamship lines special subventions for the use of their vessels as auxiliary cruisers in time of war. All such arrangements lapsed some years ago, with the exception of the £150,000 per annum paid for the "Lusitania" and the "Mauretania," which were built by means of a special loan of £2,600,000 at 2¾ per cent, to be repaid in yearly installments in twenty years, for which the Cunard Company pledged its whole fleet to the government as security, but for the year 1912 the Cunard Company received £68,000 for carry the mail between the U. K. and the United States. There were some other arrangements whereby the annual payment of £150,000 by the Cunard Company to the British government was practically offset, which means that these two boats were practically a gift to the Cunard Company, provided it would maintain them in a condition fit to cross the Atlantic at a speed of 25 knots an hour. American capitalists at that time had acquired control of a number of British lines, under the name of the International Mercantile Marine Company, and formed a working agreement with the two leading German companies. This combination threatened British supremacy, and that nation immediately rose to defend, the result being the "Lusitania" and the "Mauretania."

Germany

It was stated in Germany that the German East Africa Line and the Norddeutscher Lloyds were the only lines to which subsidies were paid for postal services, and the annual payment to these lines amounted to £350,000. There are, however, Line and the Norddeutscher Lloyd for the conveyance of mails, and German government forced emigrant transportation, but it is pointed out that

these are stated to be for actual services rendered and, therefore, not to be classed as "subsidies" (the same old German camouflage). Indirect bounties, however, were given to the German East Africa Line and the German Levant Line by granting largely reduced railway rates from inland places in Germany to East Africa or the Levant, which absolutely precluded any foreign company competing for the business, while in addition goods sent by those steamers profited by reduced rates of carriage on the Turkish and Bulgarian lines, if they were destined for stations therein.

Italy

In Italy the shipbuilding bounty amounts to £2 4s per gross ton, for steam motors 12s per I. H. P., for turbine machinery 13s 7d per shaft H. P., for boilers and other auxiliary apparatus 9s 6d per 220.5 pounds. Repair bounties are also granted, while all material used in the construction of vessels is imported free. The amount expended in 1912 on shipbuilding bounties was £248,000.

Japan

Japan, in addition to restricting its coasting trade, pays the second largest amount in direct subsidies. Of the £1,400,275 expended in 1911, £1,116,922 went for the extension of steamship £1,116,922 went for the encouragement of navigation, and £112,695 for the encouragement of shipbuilding.

Russia

Before the disintegration of Russia, it paid heavy subsidies to its steamship companies, also restricted its coastwise trade, and granted loans to shipping companies on favorable terms. For instance, two loans of £161,904 each were made to the volunteer fleet, free of interest, for the acquisition of six new steamers for service in the Far East, the loans to be repaid in twenty annual installments from 1914 onwards. A new shipbuilding bounty law passed in July, 1912, gave every encouragement to shipbuilders.

Spain

In Spain no direct bounties to shipping existed prior to the year 1909. By an act passed in that year bounties of 40 and 50 centimos per gross ton per 1000 miles navigated are paid to vessels on different voyages, provided that the entire crew is Spanish, that Spanish mails are carried free, and that the average amount of cargo carried shall not be less than 50 per cent of the ship's maximum capacity, and that of this 50 per cent

three-fifths shall consist exclusively of national products carried in the export trade. A bounty is also granted to shipbuilders amounting to £6 8d per ton gross for iron and steel cargo steamers, £6 16s for passenger, with an additional 10 per cent for every knot in excess of 14.

Summary

Foreign governmental aid to its foreign shipping can therefore be briefly summarized as working subsidies, voyage subsidies, building subsidies, loan subsidies, mail subsidies, coastal protection, speed subsidies, and indirect subsidies through government control of railways.

Let us understand here, that foreign government aid to its shipping was not deemed necessary as a result of the competition of American ships, for American ships to this day cannot be operated as cheaply as the un-subsidized foreign vessel. The European nations had a commercial struggle of their own, and each nation was aware of the importance and necessity of a merchant marine. The nations with long purses and biggest colonies finally won out. France, Italy and Austria fell by the wayside, and just before the commencement of the war Germany was encroaching very fast on England's supremacy, and Japan will, in time, take Germany's place, unless America can find a way to uphold its own new merchant marine. Therefore, in addition to the natural handicaps of a lower first cost, and a lower operating cost, American shipping in the foreign trade will have also these artificial handicaps to deal with.



A successful type of British Freighter which has accomplished much for the British marine trade

United States Governmental Aid to Its Foreign Shipping

Here is the sum total of our own Government's aid to its foreign shipping, and it is a mail subsidy. By the act of March 3, 1891, the mail pay as authorized in the act of June 8, 1872 (Sec. 4009 U. S. R. S.), was rearranged on a mileage basis as follows:

1st Class.—Vessels of at least 8000 tons and 20 knots speed, \$4 a mile, by the shortest practical route for each outward voyage. (We have no such speed vessels, and this class seems available to Great Britain only.)

2nd Class.—Vessels of at least 5000 tons and 16 knots speed, \$2 a mile.

3rd Class.—Vessels of at least 2500 tons and 14 knots speed, \$1 a mile.

4th Class.—Vessels of at least 1500 tons and 12 knots speed, \$.6666 a mile.

Vessels claiming mail pay under this act, are

subject to certain restrictions as to manning, and must be built to conform to the regulations laid down by the Navy Department, except in the case of vessels of the fourth class, which may be built of wood.

This aid on the part of our Government has not proven sufficient. The American Line, now part of the International Mercantile Marine Company, owns two American ships, but its fleet has not increased. The Mallory Line has grown somewhat since the subsidy was given to it. Elsewhere ships that were maintained under the subsidy have been driven out by foreign competition. The Japanese ships replaced the Great Northern Railroad ships on the Pacific, partly because the Japanese subsidy was more liberal, and mostly because of the greater operating expense of the American ships. Our law of 1891 has not provided an American Merchant Marine.

American business men can operate ships as cheaply as our competitors if afforded equal opportunities and similar working conditions. We have ample evidence of this fact, for American industry engaged in export commerce did invest in ships, but found it necessary, owing to our American handicaps, to purchase their vessels abroad and operate them under foreign flags. It was estimated by the Merchant Marine Committee of the National Foreign Trade Council, consisting of Messrs. Robert Dollar, James A. Farrell and P. A. S. Franklin, that the total foreign shipping owned by American interests aggregated, prior to the war, between one million

five hundred thousand and two million tons. This tonnage, unhampered by our handicaps, operated efficiently under American management, took its part in the world's commerce and materially contributed to the extension of American foreign trade.

According to an announcement made in Washington on October 26th by the Senate Military Committee as reported in the daily papers, the world's shipping tonnage is only seven per cent less than it was at the beginning of the war, and American tonnage has more than doubled. It is therefore reasonable to assume that with the tonnage America, England, Japan, Norway, Sweden and other nations are building, and which will be ready at the conclusion of peace negotiations, or shortly thereafter, that the world will have more tonnage than ever before, and that "competition" will begin almost at once. We must therefore conclude that ships designed for specific purposes, and to meet every trade of the world (every type of ship is now being used for the transportation of war supplies) will be afloat after, or shortly after the conclusion of the war; that past normal history shows that ocean freight rates are maintained at a point where profits are low, with some periods of losses, and that, in the revival of our American Merchant Marine we will be dealing with competitors who are well informed, inventive, up-to-date, alert, enterprising, resourceful, persistent and merciless. Commercial appearance on the oceans of the world will be governed by the survival of the fittest.

The Southwestern Shipbuilding Company

WHEN on October 19th the 8800-ton U. S. Shipping Board steamship "West Carnifax" slipped from the ways of the Southwestern Shipbuilding Company's yards at East San Pedro, four world's shipbuilding records were broken, even though the launching was postponed six working days as the result of events over which the shipbuilders had no control.

The records broken were:

First, the world's record for building a shipyard

of this size, this plant having been built in seventy-eight days. The first stakes for the new plant were set up by the construction engineers on March 23, 1918, and the first nails in the plant were driven on April 1st, the plant being completed on June 20th, 1918.

The second record broken was that for the laying of the keel of a new ship in a new yard. The keel of the "West Carnifax" was laid on July 17th.

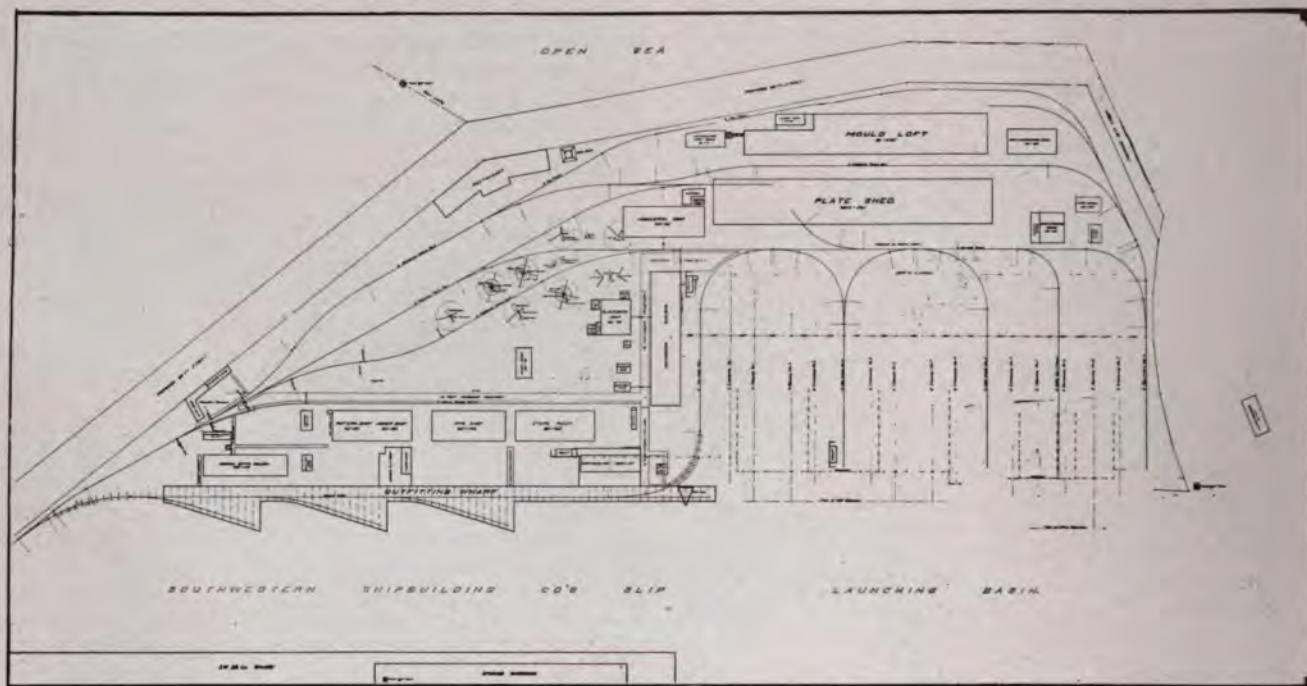
The third record broken was the speed with



Umbrella shelters for Punches in the Fabricating Park of the Southwestern Shipbuilding Company's Yard



Tractor Hauling Plates in the Yard of the Southwestern Shipbuilding Company



General arrangement plan of the yard of the Southwestern Shipbuilding Company

which four keels of first vessels in a new yard were laid.

The fourth record was for launching a ship in a new yard in ninety-four calendar days, or seventy-seven working days, up to the time of launching.

David Hollywood, works manager, who deserves much of the credit for the achievements of this plant, is known up and down the Pacific Coast as the man who knows how to build ships and the man who knows men. For seven years he was manager of the Hefferman Dry Dock Company at Seattle. In 1916 he laid out the Ames Shipbuilding & Dry Dock Company's plant at Seattle. In March, 1918,

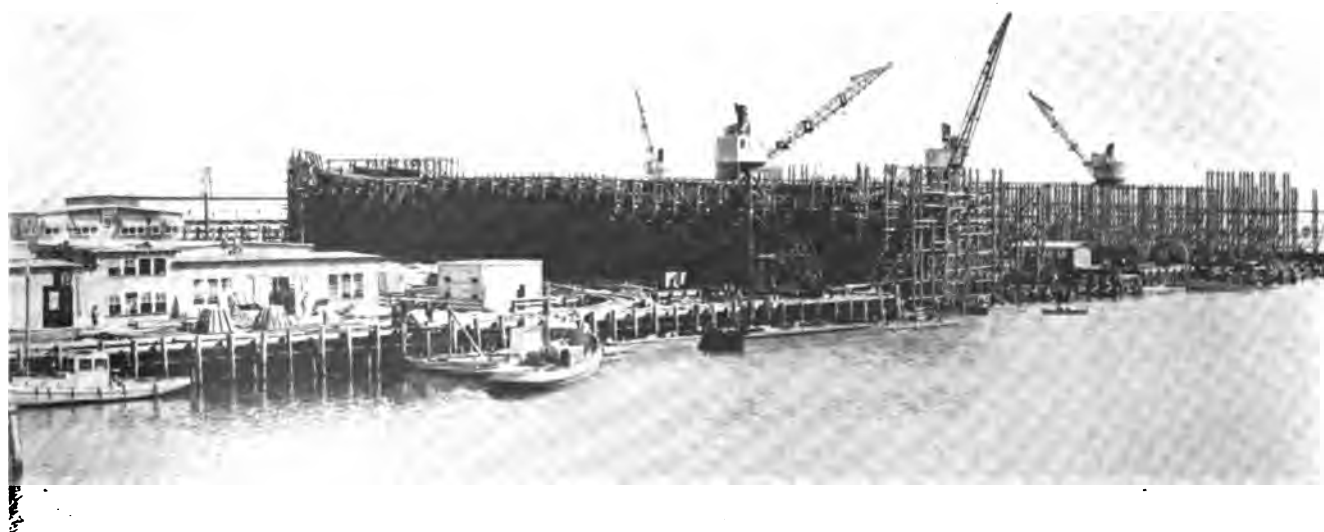
Mr. Hollywood came to East San Pedro, beginning the actual work of construction of the Southwestern Shipbuilding Company's plant on April 1st.

The record-breaking launching of the first hull on October 19th, the completeness of the plant and the loyalty of all his workmen are evidences of his able management.

Among those to whom Mr. Hollywood gives much credit for their assistance in accomplishing these world record-breaking achievements are H. A. Lennon, hull superintendent; F. S. Bunker, superintendent of engineering; J. J. Toohey, foreman shipfitter, and James Lewis, foreman shipwright.



One of the 8800-ton hulls at the Outfitting Dock



Views of the Plant of the Southwestern Shipbuilding Company taken from the same spot at intervals of three months, showing remarkable progress in construction work

men of many years' experience in shipbuilding.

Situated in San Pedro harbor, upon a strip of land which a year ago was but sand dunes, with a deep waterway alongside, near the open seaway, with a climate permitting work all the year round, the Southwestern Shipbuilding Company's site possesses natural advantages equal to any shipyard in the United States.

The plant is at the southern terminus of the Los Angeles and Salt Lake Railway, with spur tracks entering the yard and affording direct delivery of material to the steel storage racks, storehouses and outfitting wharf.

The buildings are of one and two story mill construction, painter gray with white trimmings and interiors, presenting a very pleasing appearance. The main office building fronts upon a spacious, well-kept lawn.

Twelve check gates at the entrance to the yard permit the checking in of 5500 men in about ten minutes. Adjoining the check gates on the one side is the employment office, which receives all applications for employment and keeps a record of every employee in the yard, while on the other side is the paymaster's office. Near by is the main office building, 42 x 170 feet, shared by the administrative offices and drafting room.

Immediately upon entering the gates one is impressed not only with the magnitude of the plant, which covers an area of sixty-five acres, but also by the effective utilization of all available space.

One of the prominent features of the plant is the superior layout of the spur tracks, storage areas and buildings so that material may pass in

a direct line from one process to another until erected in the hull.

Four material tracks pass through the angle park and plate storage area, and branching off to the anglesmith shop, laying off park, plate shed and the assembly yards, greatly facilitate the rapid delivery of material from one point to another.

The mold loft, laying off park, plate shed and assembly yard are arranged side by side in the order named. The main assembly yard extends alongside the plate shed, at the head of the slipways, and is equipped with bull riveters, jib cranes and electric gantry crane running the entire length of the assembly yard, a distance of 525 feet.

Steel plates are carried on flat cars from the storage racks into the laying off park, which, with the On each side there are three overhead bridge cranes, together with roller conveyors and jib cranes for conveying the steel to the shears and punch tables in the plate shed.

Plates completed and ready for erection on the hull are loaded, according to hull numbers, on flat cars on a spur track in the plate shed and delivered at the slip assembly storage racks, or hoisted by the electric traveling whirllers directly to the hulls.

Steel shapes which do not require bending are fabricated by machines which are centrally located in the angle park, protected by unique "umbrella" shelters. For shapes which require hot bending the anglesmith shop is located conveniently near to both the angle park and the mold loft.

The mold loft is a modern, well-lighted frame building, 80 x 490 feet, affording ample room for



Interior view of the Plate Shop



Tower Derrick Cranes Serving the Building Ways

the laying out and storage of the templates. This plant has gone as thoroughly into the work in the mold loft as any yard on the Pacific Coast. Templates are made of best selected spruce, this material not being susceptible to variations caused in other materials by weather conditions.

In the engineering building, 60 x 270 feet, are the tool room, machine shop, electrical shop, and the large compressor room, 126x60 feet. Six compressors of 1270 cubic feet capacity and one of 670 are now in use and two additional compressors of the larger type are now being installed. The superintendents' offices are located in the upper story, commanding a view of the entire yard.

Gas is furnished by an eight-inch pipe line and converted in the Selas house for use in the angle-smith furnace, forges and rivet heaters.

Electric power for operating the compressors, giant whirlers, gantry cranes, punch and shear tables and other units is supplied by two independent high-power lines.

The yard has four ways, for 8800-ton vessels, with four ships rapidly approaching the launching stage, and two additional ways for 10,000-ton vessels have just been completed.

The giant electric traveling whirlers serving each way, with 80-foot booms and 40-foot towers, are features of this modernly equipped plant.

The outfitting wharf is of "saw-tooth" construction, 1100 feet in length, and will accommodate four hulls. It is equipped with shear legs, 100 feet in height, with capacity of 100 tons, jib cranes and spur tracks.

Adjoining this wharf are all necessary shops for outfitting the vessels, including the marine machine shop, riggers' loft, pipe shop, paint shop, joiner

and pattern shops, and general storehouse.

The plant hospital has a consultation room, a modernly equipped operating room, and is provided with two hospital beds in private rooms. Doctors and nurses are in constant attendance day and night.

The plant restaurant has two large dining rooms, each 42 x 82 feet, with a total seating capacity of 1000 men; a large lunch counter room seating 225 men, and a modern kitchen with cold-storage, storerooms and bakery. The kitchen is a model of excellent arrangement and complete equipment and has received frequent praise of the officials of the Emergency Fleet Corporation. Substantial meals are served at cost.

The officials of the company are: Marco H. Hellman, president; J. A. Talbot, vice-president and general manager; William F. Howard, vice-president; Irving Hellman, treasurer; Emmanuel Cohen, secretary; S. Aronson, assistant secretary and assistant treasurer.

The directors include Daniel K. Drake, Benjamin E. Page and J. W. Mason.

EXPANSION OF THE SHEPARD ELECTRIC CRANE & HOIST COMPANY

The Shepard Electric Crane & Hoist Company has opened an office in the New Lexington Building, Baltimore, Md., in order to take care of the rapidly increasing Southern business, and also to give closer service to users of Shepard apparatus in that territory. The Baltimore office will be in charge of Mr. Norman P. Farrar, who for a number of years has been district manager of the Philadelphia territory.



Panorama of Alameda Works, Union Plant

The Invincible Shield

WHEN General Manager J. J. Tynan of the Union Plant of the Bethlehem Shipbuilding Corporation, named by Chas. M. Schwab "the greatest shipbuilder in the world," stepped onto the launching platform of the good ship "Invincible" and, making his way through the honored guests assembled to see that vessel take her maiden plunge into the briny, came to the prow, he had the surprise of his life. There, fastened to the stem of the ship—but I am getting ahead of my story.

It seems that when the keel of the "Invincible," 12,000-ton deadweight freighter, was laid, the men of the Alameda works were out for a construction record, so an artist among the riveters got a good copy of the U. S. Shipping Board poster in which a shipyard worker is depicted nailing Old Glory to the mast head, and he surrounded this poster with large calendar figures representing working days, thus making a graphic chart whereon time progress could be checked off as the work advanced on the hull.

The big hull was made ready for launching in the record-breaking time of twenty-four working days, and the riveting gangs were very jubilant over their achievement, none more so than our unnamed riveter artist. As an expression of his satisfaction he worked the above-mentioned poster and work-day record into an attractive poster. With happy inspiration a life-like head of J. J. Tynan was

placed upon the shoulders of the man in the poster and the completed shield was fastened to the bow of the "Invincible" just above the launching platform, as shown in the illustration. Hence the great surprise of the general manager.

The shield was carefully boxed and sent to Chas. M. Schwab, who valued it so highly that he had it handsomely framed and hung it in the lobby of the main office of the Shipping Board at Philadelphia.



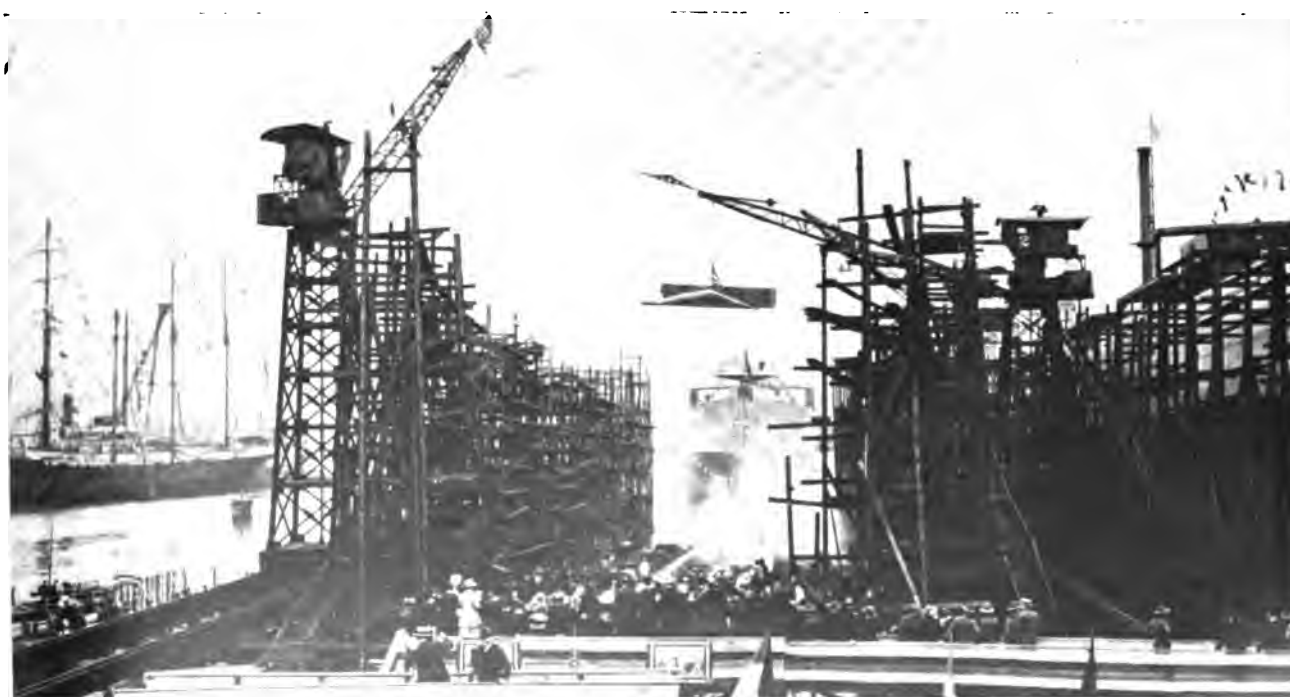
Poster fastened to the prow of the S. S. "Invincible"



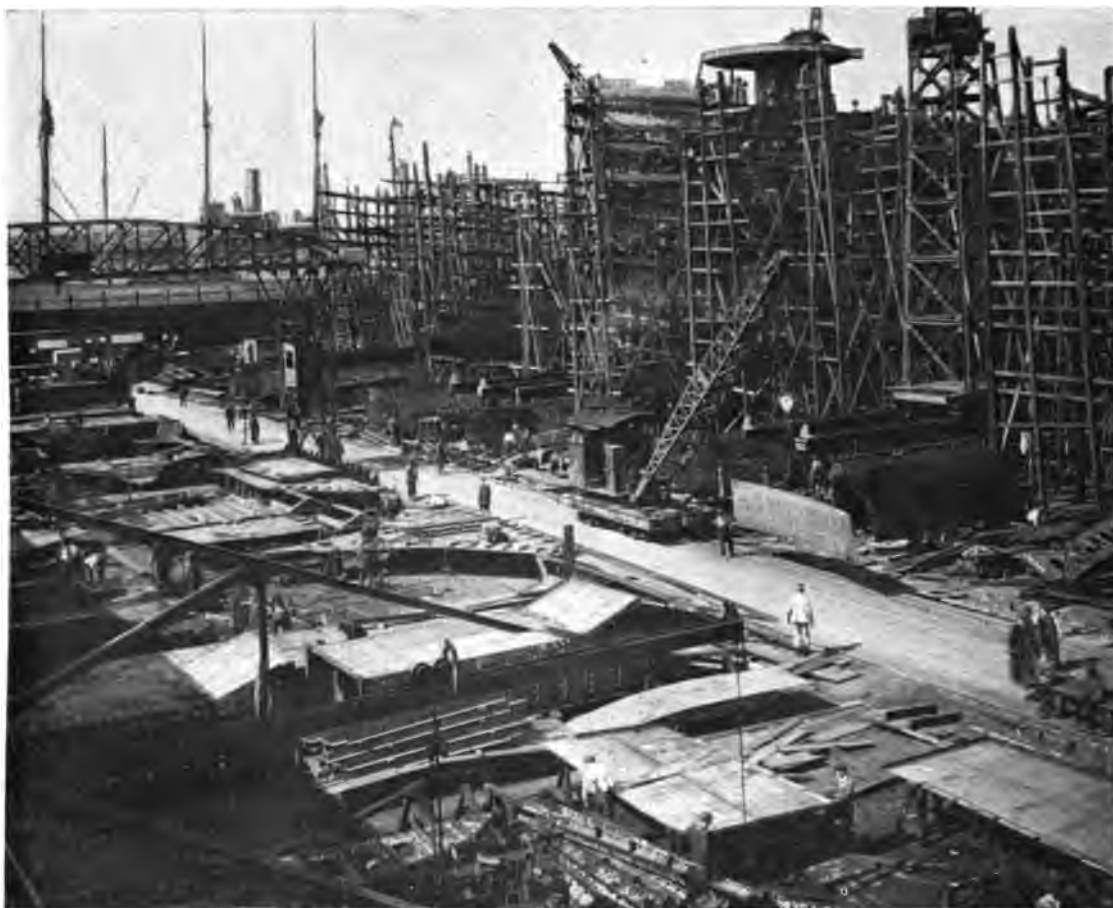
of the Bethlehem Shipbuilding Corporation, Ltd.



S. S. "Victorious" immediately before launching



The launch of the S. S. "Victorious." Keel plate on crane ready to be laid as S. S. "Victorious" leaves the ways



Showing
Fabricating
park and
shore end
of building
ways

The Amende Honorable

The "Pacific Marine Review" desires herewith to make humble apology to the Alameda Works of the Union Plant of the Bethlehem Shipbuilding Corporation for the error made in the captions of the illustrations in the November issue. We here reprint these illustrations properly captioned, and

assure our friends of the Alameda Works that there was no intention on the part of the "Pacific Marine Review" to give any undue credit to the Oakland side of the estuary or to detract in any way from the wonderful record of the Alameda Works.—Editor.



An excellent view of four of the ways at the Alameda Works of the Union Plant of the Bethlehem Shipbuilding Corporation



Shipping and Foreign Trade Questionnaire

Arranged and Reviewed by Foreign Trade Department San Francisco Chamber of Commerce

THE following questions were submitted to about 4,000 individuals and organizations representing a great diversity of industry and wide geographical range. The answers, as reproduced, represent the composite replies received. The digest for each subject is based mainly on these replies:

Ships and Their Operation

Question: Do you consider the Government should continue to own and/or operate our ships after the war or turn them over to companies better qualified to operate them and which are devoted solely to the business of transportation.

Answer: The replies showed strong opposition to Government Operation, only seventeen per cent being in favor. Arguments in favor of Government Operation were based on the apparent inability of private companies to operate in competition with foreign nations, particularly under current laws.

Eighty-three per cent opposed Government Operation for the following reasons:

"A" Because the Government is not as well qualified to operate ships as experienced shipping firms:

"B" Government Operation would eliminate competition.

Question: If ships are turned over to operating companies should it be by lease or sale?

Answer: Opinion was divided equally as to whether ships should be leased or sold. Those favoring leasing did so because:

"A" It was feared shipping companies would not be able to raise sufficient capital to purchase.

"B" It was considered doubtful if shipowners could operate under present law without Government assistance of some kind which could best be given under lease.

"C" It was feared the cost of American ships would not permit operation unless sold at a great initial sacrifice, whereas if leased the difference in cost could be written off gradually by the Govern-

A Shipping and Foreign Trade Questionnaire covering a series of pertinent questions related to Ships, Ports and Port Facilities, Banking, Merchandising, Foreign and Local Commercial Bodies, Tariffs and the various phases of Foreign Trade Educational Work, was recently submitted to some 4,000 individuals and organizations by the Foreign Trade Department of the San Francisco Chamber of Commerce.

The questions and answers, as herewith compiled, together with the digest of replies for each subject, prepared by the Foreign Trade Department, form a most interesting composite expression relative to after-the-war commerce. As a contribution to Shipping and Foreign Trade questions and discussion, now rapidly developing in importance, every question and answer in this questionnaire is noteworthy.

The production of this Questionnaire and its Answers and Digest was brought about by the invitation of Chairman E. N. Hurley of the Shipping Board for suggestions as to how we should most effectively prepare for after-the-war trade. "Pacific Marine Review" presents this data both for its timely present interest and for its reference value in months to come.

ment, and could be taken into account when making leases.

Those favoring sale based their opinion on a general belief that private companies could better control and operate ships than the Government.

Question: Is it not a fact that the large European steamship companies, such as the Royal Mail Line, Hamburg-American Line, etc., were tremendous factors in the development of the foreign commerce of their respective countries?

Answer: One per cent believed Government Operation would be better than by large practical steamship companies.

Ninety-nine per cent believed large companies were a great factor in developing the foreign commerce of other nations qualified as follows:

Because other governments fostered and protected large steamship companies.

Question: Would it not greatly stimulate our foreign commerce if most of our ships were turned over to a similar company or companies to operate on regular routes and at regular intervals and whose sailing dates could be relied upon far in advance?

Answer: Ninety per cent believed the larger and faster ships

should be turned over to large companies to operate on regular schedules.

Ten per cent believed that Government Operation would stimulate foreign commerce to a greater extent.

Question: Are not "Rate Conferences" or "Agreements" for the maintenance of rates an advantage to shippers as well as steamship operators? If such "Conferences" or "Agreements" on the part of American operated ships were under control of the Shipping Board to prevent unreasonable rates, would it not be better than constant fluctuations, unstable rates, vicious competition and possible receiverships?

Answer: Ninety-one per cent believed in "Rate

where reasonable rates would be established and maintained without discrimination or rebates. Sixteen per cent of these, however, believed the Government should have no control over the rates.

One per cent of these believed that rates should be made in conjunction with other nations.

Question: Is it not a fact that "Tramp" vessels would furnish ample competition and protection against exorbitant conference rates without regular lines demoralizing them as to make the operation of regular lines unprofitable and uncertain?

Answer: Seventy-five per cent believed "Tramp" vessels played an important part in rate protection. Twenty-five per cent did not believe "Tramp" competition amounted to much, being so uncertain and tending to demoralize regular rates and sailings.

Question: Should not our navigation laws be so amended as to permit competition with foreign countries and at the same time enable such wages to be paid and such quarters provided as would attract American youth to enter the service?

Answer: Ninety-nine per cent believed present navigation laws should be changed.

Some of the suggestions were: "A" Allowances to mail steamship companies for services performed.

"B" Making uniform laws with other maritime nations.

"C" Government to offset in some way difference in cost of wages and operation.

Digest of All Replies

Taking all replies as a whole the consensus of opinion seemed to be:

That the Government should continue to own, for a period at least, but not to operate ships. That they should be turned over under leases which would be made to offset difference in cost of construction and operation with the possible privilege of purchase. That large companies such as used to be operated by European nations were highly essential on regular schedules—such companies to be encouraged and fostered by the Government. That rates should be agreed upon and established in conjunction with other maritime nations and be strictly maintained without discrimination or rebates, but without Government control. Leases to prohibit, however, exorbitant rates or discrimination. That the smaller and slower vessels might be handled as "tramps" preferably by shipping companies, but so controlled as not to demoralize or discourage established rates or lines. That the navigation laws of the United States should be changed to enable American ships to operate in competition with those of other nations and at the same time provide for such wages and quarters as would tend to attract and encourage American boys in seeking a career on the sea. That the Government in some way should offset existing differences by other nations by mail subsidy, allowance in leases and/or other means.

Ports and Proper Port Facilities

Question: Should not the ports of the United States be improved by providing ample docks, warehouses adjacent thereto, convenient rail connection and mechanical appliances for the speedy and economical handling of cargo both in and outbound?

Answer: Unanimously in favor of ample docks, warehouses and mechanical appliances for handling cargo. These expenses form a part of overhead expense and unless cargoes can be promptly loaded and discharged at minimum of cost will materially handicap our ships. All the large ports of Europe are well equipped and it is due to this

in a large measure their commerce increased. Ports which become congested tend to divert ships.

Question: Should not "Free Ports" or "Free Zones" be provided at suitable points to encourage the trans-shipping business, to enable goods to be brought in, traded in, sorted, conditioned, mixed, etc., without being subjected to the present customs red tape, thereby attracting both commerce and foreign ships?

Answer: Unanimously in favor, many believed trans-shipping

business would constitute a large part of future commerce and that "Free Ports" were absolutely necessary. Such ports served to build up many of the leading ports of the world.

Question: Should not the port charges and customs of the various American ports be made as reasonable and as uniform as possible?

Answer: Unanimously in favor. Some considered ports were just as competitive as steamship lines and all charges and customs should be as low as possible.

Question: Should not trade routes be designed with the "Hub" idea so that commodities, on account of a constantly active market, cheap handling, efficient technical grading, specialized market outlets for re-sale through highly efficient import and export houses would be attracted from all markets to be re-shipped out again from American ports to other overseas markets, as has been a big percentage of London and Hamburg's business?

Answer: Unanimously in favor but a few thought American shippers and ship owners would work this out themselves and that Free Ports would tend to develop this.

Digest of All Replies

Taking all replies the opinion seemed to be that the ports and their facilities of the United States, as a rule, were entirely inadequate for a very large expansion in foreign trade. That in order to compete with other nations proper docks, warehouses, loading and discharging appliances should be ample and of the most modern type, as ports were just as competitive as steamship lines, railroad lines, etc. That to utilize the vast Merchant Marine being built, special efforts would have to be made to secure a large amount of trans-shipment tonnage which could only be done with a system

Capt. Robt. Dollar Says:

Regarding the meeting of the Foreign Trade Council held last month in New York:

"The meeting was in accord with and strongly in favor of the results of your questionnaire."

of Free Ports. That the large European ports owed their growth and prosperity very largely to the facilities and low cost of handling they afforded.

Banking—At Home and Abroad

Question: Is it not vitally essential that American banks be provided in foreign countries? Do you consider this can best be done by the Federal Reserve Bank, or by individual banks, or by combinations of national banks?

Answer: Seventy per cent favored American banks, either combination or national or individual banks.

"A" Because the resident managers would have more liberty of action and seek trade.

"B" Because they would encourage investment of American capital.

"C" Because European banks in foreign countries while controlling the finances exerted a considerable influence in favor of the merchants of their own nation.

Thirty per cent favored the Federal Reserve Bank establishing branches in the leading cities of the world.

"A" Because they were more apt to give the same service to all.

"B" Because they could operate on a smaller margin.

Question: Do you not believe some arrangement should be made whereby local reserve banks can realize, through re-discount at Federal Reserve Bank, on advances made to shippers on documents, and not necessitate the local banks carrying this burden during the time required for collection? Would not such an arrangement give a much greater leeway to the local banks and, in consequence, facilitate such transactions?

Answer: Unanimously in favor for the following reasons:

"A" Because it would go a long way to strengthen the importer and exporter.

"B" Because it would enable home banks to carry these accounts in larger quantity. The foreign customer must be given reasonable credit and this was an excellent means of providing for it without curtailing the credit of either the exporter or the local bank.

Digest of All Replies

It was the consensus of opinion that one of the principal requirements for enlarging our foreign trade was the establishment of overseas banks in all the principal cities of the world, whether they were National Banks or Federal Reserve Bank Agencies, Trust Companies or Private Banking Institutions operating with American capital. That European nations could trace their prosperity to the fact of having their own banks in foreign countries.

Merchandising Standards

Question: Do you not think the various standards of quality, etc., as adopted by the leading countries on the various commodities imported should be on file and available to the Chamber of Commerce so that body could pass upon imports authoritatively, thereby safeguarding importers and/or foreign shippers as well as facilitating advances from the banks?

Answer: Fourteen per cent were opposed believing individual merchants and the various merchandise associations would take care of it.

Eighty-six per cent were in favor of, with following qualifications:

"A" Believe the various standards adopted by producing countries should be available.

"B" New standards should be procured for each year.

"C" Believe contracts should contain provision that Chambers of Commerce act as final authority in case of disputes.

"D" Believe the Department of Commerce is better qualified to act than local Chambers.

Digest of All Replies

The consensus of opinion of those favoring the suggestion was that Chambers of Commerce at the various large American ports should have on file and available the various standards adopted by the countries where the articles in question were produced.

One per cent thought contracts covering purchases should contain a suggestion that the local Chamber of Commerce should act as a final authority in case of disputes.

Two per cent believed the Department of Commerce could best handle this through its various agents in sea port cities and in conjunction with local Chambers.

American Chambers of Commerce in Foreign Countries

Question: Do you not think it a wise policy to encourage the formation of American Chambers of Commerce in foreign countries to be composed of American merchants and their representatives located in such countries for the purpose of having a reliable body to deal with in cases of dispute or arbitration?

Answer: Eighty-six per cent in favor.

Fourteen per cent opposed on the grounds it would insinuate a lack of confidence in local Chambers.

Digest of All Replies

The majority opinion was that American merchants in foreign countries should get together and form local American Chambers of Commerce not for the purpose of arbitration, but to band together the interests of American merchants.

Tariffs

Question: Do you not think our tariff system should be so constructed that it could be made a

The Great Falls, Mont., Commercial Club writes regarding merchant marine matters:

"At the time your questionnaire and letter arrived at this office we felt that being an inland point very little could be done by the members of the Great Falls Commercial Club in securing their interest in the foreign movement. Since that time we have been communicating with the office of the U. S. Shipping Board and have been further enlightened on this important subject. After investigation, we are of the opinion that a Merchant Marine Committee should be appointed in all communities, in order that they may get an organization together which in turn will get behind our new ships and spread publicity relative to how many ships are being built and how many are flying the American flag."

"bargaining" tariff to be used in securing equitable treatment from foreign nations in exchange for like treatment by the United States?

Answer: Eighty-three per cent believed in a fair reciprocal tariff so modeled as to conform to conditions brought about when peace comes.

Seventeen per cent were opposed without specific reasons.

Digest of all Replies

There was considerable divergence of opinion in regard to tariff. Some felt it was purely a political question. Some opposed reciprocal tariffs, whereas others favored them. Generally it was thought the Federal Tariff Commission now investigating this question could best protect American interests.

Visiting Foreign Countries

Question: Do you not think merchants should be encouraged, and even urged, to send qualified representatives or go themselves, to get in personal touch with foreign buyers and sellers, with foreign requirements and conditions and to establish proper representation?

Answer: Unanimously in favor. Claimed absolutely necessary to study conditions under which business is done in various countries and methods necessary to employ. Claimed European nations succeeded on account of their knowledge of foreign requirements and conforming thereto.

Question: Do you not consider it would be well to specially call to the attention of manufacturers in the interior of the United States who may not be able to visit foreign countries and establish their foreign trade in a fundamentally efficient way, as above indicated, the suggestion that they appoint some one in the American ports as a "manufacturers' agent" to visit the already established, efficient and highstanding export houses, so as to avoid the customary losses from guess-work as to financial ratings, moral risks, technical regulations as to consular documents, payments, acceptances, etc., in foreign countries?

Answer: One per cent opposed believing merchant would find the manufacturer.

Ninety-nine per cent in favor. Was claimed European manufacturers did most of their business through export agents.

Digest of All Replies

All replies strongly endorsed necessity for visiting foreign countries personally for the purpose of learning condition, requirements, establishing representatives and coming into personal contact with prospective purchasers. All but one believed manufacturers in the interior should be encouraged to seek foreign commerce through export agencies and take advantage of the provisions of the "Webb" Bill.

Extension of Government Representation Abroad

Question: Do you not think our Government should send competent trade representatives to the

various foreign countries to make reports; that the compensation for such representatives should be sufficient to secure practical men and give them ample help? While it may be true many of the reports now being made are of little value, could not competent agents gather and send in such information of value as to what other countries were doing, samples of articles supplied by such countries, with prices, etc.?

Answer: Fourteen per cent were opposed on the ground there were already too many who did not understand business, engaged in representing our Government. That the work could be better done by firms themselves or through the Consular Service.

Eighty-six per cent favored an extension of Trade Representation by the Department of Commerce but almost unanimously decided:

"A" Higher salaries should be paid to secure competent and experienced men.

"B" That proper allowances should be made for clerical help, etc.

Digest of All Replies

It was almost the unanimous opinion that if the Government would send practical business men to the various foreign coun-

tries, paying such salaries as would attract competent men and making such allowances for clerical help, etc., as might be necessary it would be of considerable help, but that to send men not so qualified was worse than none at all and they did not believe competent men could be procured for any such salaries as the Government now pays.

Local Commercial Organizations

Question: Do you not think the Chambers of Commerce, or similar organizations, throughout the country should devote more attention to promoting foreign commerce and an interest in it?

Answer: Unanimously in favor and many valuable suggestions offered:

"A" Chambers of Commerce are in duty bound to try and create an interest in shipping and foreign trade.

"B" Moving pictures showing how cargo is handled in foreign ports and necessity for proper packing and marking would show manufacturers the necessity for proper precautions.

"C" Chambers of Commerce should encourage the organization of foreign trade clubs to study foreign trade, have well posted men deliver lectures and generally work up an interest.

Question: Should not Chambers of Commerce at the seaports use special efforts to bring to the attention of Chambers of Commerce in the interior cities concrete examples of the importance of overseas imports and exports and shipping to the healthy financial condition, prosperity and progress of the country, so that these interior Chambers could see that this question, although indirect, is vitally their question as well?

Chairman Edward N. Hurley of the U. S. Shipping Board writes:

"I have just received a copy of your circular notice to your members, under date of August 10, together with your printed statement of San Francisco business men. I appreciate the magnificent spirit which your organization has shown and the able manner in which you have prepared your questionnaire. It is work of this kind which will educate business men to the necessity for undertaking export business after the war. My only hope is that you can keep up your splendid work."

Answer: Unanimously in favor with following suggestions:

"A" It is a duty of seaport Chambers to try to create an interest in foreign trade and shipping in the interior.

"B" They should prepare articles showing the value of foreign trade and ships with figures indicating its importance.

"C" They should bring to the attention of interior communities the conditions and opportunities in relation to the articles they are particularly interested in.

"D" The decadence of our Merchant Marine in the past was due to lack of interest and it is the duty of Chambers of Commerce to overcome this indifference. Every Chamber of Commerce regardless of its location should have a committee to consider foreign trade and shipping, it is a duty they owe the country as well as themselves.

Question: Do you not think these various organizations should work more closely together on this question and interchange views and suggestions and use greater efforts in keeping shipping and foreign commerce before the minds of their respective members and the public generally in their respective localities?

Answer: Unanimously in favor with following suggestions:

"A" The Chambers of Commerce located in the various seaports should work in very close harmony to create a unified national sentiment on foreign trade and shipping and help it filter through into interior sections of the country.

"B" If commercial organizations throughout the country will work intelligently and persistently to work up an interest in foreign trade and shipping it will create an interest and enthusiasm that nothing can stop and the future prosperity of the entire country will be enormously increased.

Digest of All Replies

The consensus of opinion seemed to be that Chambers of Commerce not only should devote their energies to creating an interest in foreign trade and shipping but that it was their duty to do so; that those located at seaports should act in harmony and work up enthusiasm in interior cities; that an educational campaign should be undertaken to show interior manufacturers the necessity for proper packing and marketing; to bring to the attention of various localities the opportunities in foreign countries for their specific products and the value of foreign trade; to start a movement which would gradually grow and become irresistible of the necessity of foreign trade.

The Citizens' Duty

Question: No matter how well your business may be going, no matter how well you may be represented in foreign lands, no matter whether your foreign business is satisfactory and ample, do you not think—as a patriotic duty—you should

endeavor to create an interest in foreign commerce and encourage and assist those who are not so fortunate to the end that a greater foreign commerce may bring a greater measure of prosperity to the nation as a whole?

Answer: Unanimously in favor and following suggested:

"A" Believe various Chambers of Commerce at seaports should show their members what they are doing through moving pictures and that these films be interchanged between the various chambers so all could learn and profit by what others are doing.

"B" Believe this not only a patriotic duty but a common sense business proposition and that those who selfishly refuse fearing competition, should lose the respect of their fellow merchants.

"C" Believe merchants should take a personal interest in seeing their employees are encouraged to learn foreign trade methods, suggest courses of reading and generally help those under them.

"D" Believe merchants should encourage the organization of foreign trade clubs where they and their employees could hear addresses from well posted men and foreign visitors.

Digest of All Replies

It was the consensus of opinion that merchants should both as a patriotic duty and a business proposition do all in their power to create an interest in foreign trade, encourage and assist their employees to do the same; to learn what others are doing and to eliminate any narrow, selfish policy and work for the general good of the entire country which, in the end, would be to their own advantage.

Final Deductions

Taking into account all the replies received from the "Questionnaire," from reports of other organizations, Government Bureaus and other nations, the Foreign Trade Department submits the following deductions:

That an intensive foreign trade campaign will undoubtedly be undertaken after the war by belligerents as well as neutrals; that the question of raw materials, cost of manufacturing, transportation and finance will undoubtedly be the principal factors in such campaign.

That with respect to raw materials the United States will in some instances be at a disadvantage; that this disadvantage might be overcome to a certain extent by:

"A" Developing the resources of the Philippine Islands and other Insular possessions.

"B" Developing and initiating the production of many raw products and minerals in the United States and its Insular possessions, and,

"C" By reciprocal treaties with nations having essential products necessary for our Industrial and National welfare.

That with respect to manufacturing it is doubtful whether wages in the United States will ever be as low as in other countries, therefore, it is the

The Milwaukee Association of Commerce has this to say about Foreign Trade Development:

"At this time, we can say that the questionnaire impresses us as immensely valuable and exceedingly to the point. Our own foreign trade development is progressing slowly, and we therefore cannot venture suggestions. We will rather take suggestions from your questionnaire and for that reason thank you for the copy that has been mailed us."

more necessary for American manufacturers to offset this difference by intensive manufacturing, the adoption of scientific efficiency methods, the utilization of waste water power and by-products, and taking advantage of the provisions of the Webb-Pomerene Law.

That with respect to transportation the United States is in some cases at a disadvantage owing to the distance from tide-water of many of its manufacturing industries; that this could be largely overcome by:

"A" Low import and export rates to and from manufacturing centers on the one hand and seaports on the other hand.

"B" By such reasonable ocean rates and regular sailings which taken in connection with low inland rates would equalize or offset any advantages possessed by other nations.

"C" By developing and utilizing the inland waterways of the country to the highest possible extent.

"D" By having the Government write off as depreciation in the value of the ships about thirty per cent per annum until the actual had approximated the current value of the vessels.

That with reference to financing our overseas trade—it is opined that the foreign trade of the United States cannot successfully be developed so long as it is necessary to operate through banking institutions of competing countries. If the United States succeeds in establishing a system of International Banking, thoroughly suited to cope with the new order of things, a great forward step will have been taken in consolidating the progress already achieved through the industrial energies of our population.

That proper banking laws should be enacted providing that advances made by banks on vessels should be an absolute lien on such vessels with no possibility of a prior obligation. In England well defined and settled laws are in effect operating successfully to the end that such loans are considered desirable forms of investment.

That the United States Government through its various departments should use every effort to build up, populate and develop the Western portion of the country, thereby distributing the wealth, population and production of the entire country and by encouraging manufacturing in the West and South, materially decrease the present cost of transportation of the raw products to and the finished products from the various centers of manufacturing.

That the laws of the United States should be so changed as to avoid political interference with large business and that such business organizations should be encouraged and fostered under such laws as would prevent injustice to the people at large while at the same time encouraging the investment of capital in further enterprises.

Changes Needed in Merchant Marine Laws

That the Merchant Marine Laws of the United States should be so changed as to permit the successful operation of the vast merchant fleet being constructed in competition with other maritime nations while at the same time allowing such wages and conditions as would attract Americans to enter its service.

That our existing educational system along commercial lines is defective, and that reforms in many directions are urgently needed. There is no more important national movement than that which aims to make scientific study directly applicable to practical life.

That all Chambers of Commerce, Government Bureaus, etc., should, direct and through the executives of the respective States, endeavor to create an interest in foreign trade and shipping throughout the entire country; should encourage an educational campaign to instill in the minds of pupils an interest in foreign countries and travel and that at least one modern foreign language be taught. That the Government should procure moving pictures of foreign countries, their people, method of living, means of transportation and products and that such pictures should be shown throughout the entire country from time to time either direct by Government supervision through the auspices of Chambers of Commerce or other means.

That the ports and port facilities of the United States should be improved and equipped with adequate docks, warehouses, mechanical appliances, fueling facilities, etc., to the end that the cost of handling might be reduced to a minimum and the time of vessels conserved. That free ports should be established at suitable ports to facilitate and attract trans-shipping business, thereby attracting ships of foreign nations, and because in free ports all freighting operations between car, ship, warehouse, etc., can be handled much more quickly and cheaply than under present American port arrangements.

That American capital should be invested in the development of the natural resources of foreign countries thereby increasing the purchasing power of the native inhabitants and providing greater opportunities for selling American products.

That the United States must take its proper place in the world and discard its previous provincial policy and that to accomplish this the people of the interior must be enlightened and educated to the knowledge that the entire future prosperity of the Nation will be dependent upon the part it takes in the foreign commerce of the world.

A NEW DANISH DIESEL ENGINE WORKS

Much interest has been created on the other side of the ocean by the formation of a large Danish concern to manufacture marine oil engines and build vessels fitted with the latter. The new concern is to be called the New Danish Diesel Engine Works, and will be established at Frederiksholm, near Copenhagen. The firm is not a public company, but represents a combination of the two largest shipowning firms in Denmark, namely, the East Asiatic Company and the United Steamship Company, both of Copenhagen. This combination for the formation of a motor shipbuilding company, with such a large capital as \$5,500,000, is of special significance, since both firms are the owners of Burmeister & Wain engined ships, the East Asiatic Company being owners of motor ships exclusively, and at the present time they have a larger fleet of motor ships than any other firm.



View of the Plate Storage Racks, Plate Shop and Building Ways, Long Beach Shipbuilding Company

The Growth of the Original Southern California Steel Shipbuilding Yard

JOHN F. CRAIG, the active head of the Long Beach Shipbuilding Company, is the pioneer in steel shipbuilding in Southern California. Sir Archibald Denny, of Denny Bros., Ltd., of Dumbarton, Scotland, once remarked that three

over by a corporation known as "The California Shipbuilding Company."

In the spring of 1917 John F. Craig realized that the market for steel cargo vessels was exceedingly brisk and the selling prices very attractive from the building viewpoint. He therefore secured a piece of land directly adjoining the plant of the California Shipbuilding Company, organized an executive and engineering staff, and built a new yard on the same general plan as the old. In December, 1917, he formed the Long Beach Shipbuilding Company, which took over the New Craig Shipbuilding Company and the California Shipbuilding Company, and operated both yards under the management.

The combined yards have an area of thirty-one acres and a fine water frontage 2700 feet in length. The ways were constructed for the side-launching method of erection, and there are three berths permitting the construction of four and one-half 425-



generations were required to produce a shipbuilder. Assuming this requirement to be correct, Messrs. John F. Craig, father and son, are accredited thoroughbreds in marine construction, for the Craig Shipbuilding Company at Toledo, Ohio, saw two generations of the Craig family engaged in building hulls. After the sale of that plant, John F. Craig, Sr., son of the founder of the Toledo yard, moved to Los Angeles, and in 1907 established a steel shipbuilding yard at Long Beach. In the new location his sons in turn became interested and, joining forces with their father, grew in effectiveness with the growth of the business and are now an important factor in the success of the organization.

Early in 1915 the Craig interests in the Craig Shipbuilding Company were taken

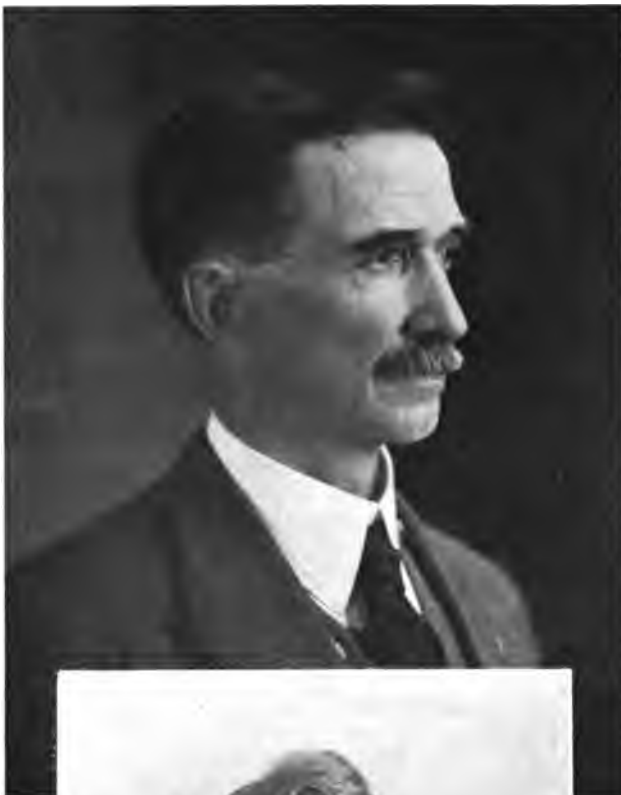


Upper cut shows keel blocks with keelson laid in place. Lower photo shows permanent scaffold and Bridge Cranes on the Slip Ways, Long Beach Shipbuilding Company

foot hulls at the same time. On a large portion of this practically continuous building berth there is a permanent trestle on the inshore side which serves the double purpose of supporting the track for the bridge crane and acting as scaffolding for erection uses. On the out-board end the crane bridge is carried on a skeleton tower, which travels on a rail laid on the building berth. The dual yards are each completely equipped with machinery for plate and shape working and fabrication, and ample provision has been made independently for pneumatic power tools, oxy-acetylene welding and cutting, forging, etc. The large and splendidly-fitted out machine shop is common to both yards. Six locomotive cranes are used in the laying-out and fabricating parks. Practically the whole ground surface of both yards has been paved with asphaltum.

This firm has been awarded contracts by the Emergency Fleet Corporation for ten 9000-ton and eight 8000-ton steel freighters. Five of these latter have been launched during 1918, and in addition three submarines, the unfinished contract of the California Shipbuilding Company, were launched and completed and there is now on the ways a steel steamer 265 feet long, 3200 tons deadweight capacity, designed along the lines of the S. S. "El Dorado." This latter ship is to be equipped with Babcock & Wilcox water tube boilers and triple expansion engines.

As now organized, the executive staff of the Long Beach Shipbuilding Company is composed



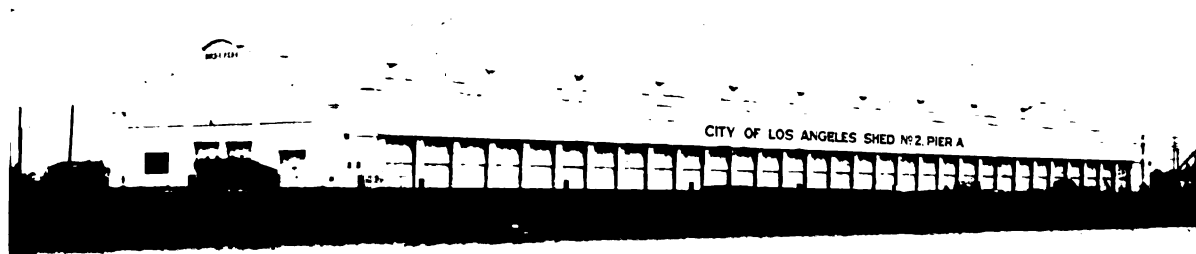
John F. Craig, Chairman of the Board of Directors, Long Beach Shipbuilding Company, and E. C. Denio, Counsel



of John F. Craig, chairman of the board of directors; E. C. Denio, counsel; Thomas Merrill, general manager; John F. Craig, second vice-president and secretary; James G. Craig, treasurer, and Lloyd Swayne, mechanical engineer.

Veteran Navigator Light- house Tender Retires

Captain Wm. E. Gregory, the veteran navigator for many years in the service of the United States lighthouse department, a few days ago announced his permanent retirement from sea duties. During the fifty-three years of his sea career, Capt. Gregory has put in most of his time aboard the lighthouse tenders delegated to duty in North Pacific waters, and many of his Alaskan experiences are replete with adventures undreamed of in the wildest of sea romances. Recently the veteran took the lighthouse tender "Columbine" to the Atlantic, where she became a dispatch boat for one of the North Atlantic fleets allied with the British squadrons in blockading Germany. Capt. Gregory participated in this venture for three months, after which he was ordered to Washington for retirement.



Pier on the Los Angeles waterfront. This is an excellent example of the terminal facilities provided by the progressive Southern City for its fine harbor

Congressman Kahn on Foreign Trade and the Merchant Marine

POLITICAL and economic observers have repeatedly said that it is to be expected that any and all serious questions of national or international welfare and procedure should progress in their development by more or less regular stages of transition in the popular mind of the people. Perhaps four stages of progress are definite enough to classify: 1st—The period of inception or establishment of the question; 2nd—the period of wide-spread public discussion; 3rd—the gradual transition from words to action, and the 4th—or period of action and application.

The present national Maritime and Foreign Trade subjects offer a current example of the general working out of such a formula. Nationally and internationally we have recognizably passed through the first or introductory period; the problems are with us, we have seen their beginnings and have observed their growths. So much is definite and conceded. From this it is but a step to the second period, that of wide-spread public discussion, and it is easily this phase of the Maritime and Foreign Trade questions that we have vividly, not to say rampantly, in our midst now. Merchant Marine and Foreign Trade matters leaped at one bound from a dark pocket in the national wardrobe into the brightest "place in the sun." The question is, and very properly so, developing a luxuriant growth of words. There are as many offerings of opinions, solutions, modes of procedure and panacea of all ills in the shipping world, invited and uninvited, as there are minds to think and mouths to speak. All of which popularity augurs well for the eventual rational solution of the various big phases of the maritime question, for it patently is a stupendous national issue, and as such will reap nothing but good from a public well informed. It may be safely assumed that a public talking is also a public thinking.

Nevertheless an observer of this present phase of the matter might be forgiven for unconsciously likening the flow of words and rolling oral verbiage to a smoke screen within which the real and definite subject loses itself. Maritime and Foreign Trade have suffered from and are still laboring under a policy of too much generality and not enough of definiteness. In other words the third and fourth phases of the question are not arrived at swiftly enough.

In this connection the recent public utterances in San Francisco of Congressman Julius Kahn, California's able and nationally respected member of the lower house, are of interest. Not spoken officially, but as one man of business to a group of his kind, they have the virtue of definiteness and soundness, and while the Congressman touched only details of the main issue, his words are important in their indications of the mental attitude of at least one concededly important national lawmaker.

In speaking of foreign trade development and attendant subjects he said:

"Many American young men will now avail themselves of the opportunities in the consular service. Now that we have won this war, the future of the new trade with foreign countries is to be the paramount issue. Our young men are going to prepare themselves properly to represent the United States in foreign parts, and one thing I am sure of—we have to teach the coming generation more of the languages than we have heretofore, and the young American will have to apply himself in studying them. I consider Spanish and at least one Oriental language as a part of the necessary education of a cultured gentleman, and here in California especially this is true, as our greater trade is to be with the Orient and Spanish-speaking countries.

The American consul is to have a standing he has never had before, and our flag will be more respected everywhere than ever before. In every foreign land where the American flag waves, it will be an emblem of protection to all Americans.

Men have been entering the consular service for years, first from political appointment, and by Civil service since 1908, but very little is known of the service and

very little interest has been taken in it by the average American young man. But now it will be a new career for him.

"The pay is very good, but to make this branch of the Government service truly successful, the American young man who thinks of entering it must not do so because he thinks it is the only avenue open to him. He must enter it with the idea of making it his life's career, and honest, conscientious work will be rewarded with promotion.

"To bring our consular service up to a proper standard our future consuls must study languages as well as international and marine law. They must be adaptable, be able readily to understand people and be able properly to maintain the position which their official capacity gives them.

"The consular salaries were standardized at the time the service was put under the Civil Service. Other countries standardized this part of the service at the same time. Instead of the consul retaining all his fees as his salary, he is now paid a flat salary, which is fixed according to his post and office, and all the fees are sent to the department at Washington.

"The diplomatic service, which is separate from the consular service, is notoriously underpaid. In most instances you will note that the diplomatic positions are filled by men already known in the business and professional world as men of wealth. Many people will recall that when David Jayne Hill was appointed to the embassy in Berlin, the Kaiser objected to him strenuously because he

Congressman Julius Kahn of California, known nationally for his far-reaching work in the House Committee of Military Affairs, gave the following interview on a recent flying visit to San Francisco. Coming from a lawmaker of national importance, his words herein are worthy of every citizen's thought.

was a comparatively poor man, although he was most talented.

The service is being improved yearly, and it is a service in which the young American can distinguish himself."

In other words, it is recognized that the consular service is a business service which should be operated only by trained business men if we are to compete with the rest of the world in buying, selling and moving goods.

On the subject of maritime laws, Kahn had this to say:

"We can't go back to the old conditions. Forward and onward will be the motto of every civilized nation. Fortunately we are going to have some American ships after this war. The problem is to retain them under the American flag. But you can't expect our ships will be run under the American flag if conditions make it impossible to compete with the merchant marine of the world; so we will have to change our laws relating to the merchant marine.

"Mr. Hurley has gone to Europe to get the nations of the world to agree on a program that will be fair to all. I wish him unbounded success. It will be a triumph for America if this program is put through. I, for one, hope we have learned some lessons from the past, and will enact wise legislation to keep the starry banner at the masthead of American shipping in all the seven seas."

Speaking further of ports, port customs and practices as a vital factor in trade development with reference to all ports in general and to San Francisco in particular, he said:

"One of the great problems in the San Francisco harbor is the matter of charges. The navigator is not going to a harbor where the cost is so high it won't pay him to enter. They tell me the charges for fresh water in this harbor are exorbitant. If so, they should be reduced, even though the community had to pay the excess. Pilotage is said to be too high. The pilots should be paid good salaries for their hazardous work out of the public treasury, rather than be allowed to rely upon fees. That is the general trend of legislation.

"The world is depending on good harbors. On my first visit to Europe they showed me with great pride the harbor of Antwerp. Compared to ours it is nothing. The little harbor of Hongkong I saw filled with shipping, but we seldom see any vessels in our wonderful bay here. The Panama Canal probably will be opened up after the signing of peace, and the great benefits we all felt would flow to us by reason of it will readily be seen.

"We must make this port attractive to the sailing master. Then it will be a gold mine. It would mean the expenditure in this port of millions of dollars a year.

"This city by the western gate is one of the few places in the world where there are so many natural facilities. It was destined by God to be a great commercial port. Where God has done so much, surely man can do his mightiest to make it still more attractive."

Fire Protection of Port of Seattle Terminals

By G. F. Nicholson, Chief Engineer

THE timber type of wharf should be protected with all the latest fire protection appliances that can be used to good advantage and the same should be taken care of in a thorough and systematic way. The Port of Seattle terminal sheds and warehouses have been made as fireproof as possible. Automatic sprinkler systems have been installed, so that not only the insurance rate is reduced materially, but a fire is given little chance if the sprinkler system is in proper working order and performs its functions. Automatic sprinkler and fire-alarm systems have been installed in every transit shed and practically every warehouse of the Port of Seattle. Fire walls have also been provided below the dock surface every 100 feet with fire manholes installed midway between them in order to allow for the use of the bull-dog nozzle of the fire department from above deck. As called for by ordinance, a complete fire wall, together with rolling steel or metal covered door, has been installed every 500 feet, together with fire curtains at 100 feet intervals. Fire hose and fire extinguishers, pyrenes, etc., have been used in a liberal manner, and signs noting the location and directions form an important service in the use of the fire-fighting apparatus. There are also steamboat and fireboat connections. The concrete warehouses are each provided with a roof tank for furnishing a secondary source of supply in case of breakage in the city water mains. The open wharf at Smith's

Cove terminal has a number of monitors high enough to be above piles of lumber or other storage and so located that every square foot of open wharf can be reached with a stream of water. This complete system of fire protection not only serves as insurance against fire, but also effects a large reduction in the insurance premiums, both on the structures and the goods. The local building department of the city has recognized the importance of the addition of such fire-fighting apparatus, and as a result of the installation of our equipment, new ordinances have been put into effect in order that wharf sheds and warehouses on the waterfront would be less hazardous to fire.

Recently the Port Commission has installed at all terminals a system of flood lights, in order to safeguard properties against acts of violence. In this way the water area alongside wharf and land area to the rear of facilities has been lighted in such a manner that any boat or person could be seen by the watchman or guards at a great distance. This is the cheapest protection for water terminals, since if the water area were not lighted in this way, a dozen watchmen on a long wharf would not be as efficient as one watchman with the aid of the flood lights. Any boarding up of the piles in order to protect docks would be very expensive, and the cost of maintaining the same would be exceedingly high. After the war period this system of lighting will be continued in order to protect terminal property.

American Diesel and Surface Ignition Engines

By Philip Lane Scott

THE Diesel and surface-ignition engine industry holds an unusual position among our commercial undertakings, as they are wholly foreign in source and their development in America is still influenced to a considerable extent by both foreign capital and ideas. The four or five best known Diesel engines in this country were constructed under patent rights secured from developers in Sweden, Holland and Germany. Drawings and technical assistance were in most cases supplied with the license. We have shown much apathy in regard to the development of a distinctly American type of Diesel engine. Only one concern has built a successful engine of this type upon what can be called an American design. It is interesting to note in this connection that the workmanship on this American engine is quite as fine as on any foreign machine, although the careless comment is often heard that we cannot build the Diesel engine because too high a grade of workmanship is required. It is not at all true. A good Diesel engine does not require a higher class of workmanship than a good steam engine; but a poorly designed one nearly always will require it.

The development of the surface-ignition engine is not so discreditable to us. Although most of the surface-ignition engines built in America have come from foreign design, yet there are several that are truly American products.

There are in America about six firms of importance making Diesel engines and perhaps twice that number making surface-ignition engines, which deserve consideration. The output of one of these plants is about 70,000 horsepower per year for marine service, but most of them do not approach that figure.

There has been, during the last year, an increase of applications for licenses and developed marine designs from foreign concerns. One foreign licensor has granted rights to two of our largest shipbuilding concerns. Several firms have developed marine engines from their former stationary oil engines during the past twelve months and two of them have attacked the work with their entire energy.

It is not desirable now to make public much in detail regarding the newer and therefore more interesting improvements, but it can be mentioned that a surface-ignition engine has been produced within the last year which develops fifty per cent more power per cylinder than has heretofore been obtained. It has a direct fuel injection system (no air compressor) and yet the fuel consumption compares very favorably with any Diesel engine.

Further that a Diesel engine has been developed surpassing the previous American mark for horsepower per cylinder by 100 to 200 per cent, and that work of much promise is being done on an engine having two pistons and a movable cylinder head between them, as a cylinder unit. This requires five crank throws, but may permit the production of far greater horsepower in a given space. And finally, that much time and effort are being given by one of our noted inventors to the study of expanding the working gases in more than one stage. In short, we are waking up, and our good

engineering record as a nation will surely be improved through the present efforts.

It should be remembered that, in mechanics, the American has an intuitive mind, while the German (who has done most of the work in developing the Diesel engine) is deductive. So it is that Germany cannot boast of many important inventions. The Diesel engine and the Roentgen ray are among the few, whereas the list of American great inventions is long and imposing—the telegraph, the phonograph, the telephone, the torpedo, the machine gun, the powered and controllable aeroplane, are some examples. But we have been singularly apathetic as to the development of many of our great inventions and have thus discouraged inventors, often driving them to other countries for recognition.

But to return to the general features, good and bad, in the design of American Diesel engines. The more important points only will be considered, since it is not within the scope of this article to cover the subject in detail. We have represented now in America adaptations of three Swedish, three German, one Danish, one Dutch and two English designs, among the more successful engines, and we have about half a dozen good developments of our own.

Among the Diesel engines, no two stroke cycle engine built here now can be said to be entirely satisfactory, but there are a number of very good four stroke cycle engines. Among the surface-ignition engines there are more two stroke cycle designs than four stroke cycle, which is due to a less strict demand for high efficiency. The general relation between two and four stroke cycle, as regards power for a given piston displacement per unit time, is 1.5 to 1 in favor of the two stroke cycle. The ratio is theoretically two to one, but poor scavenging in the two stroke cycle reduces this very materially.

Under general constructive features we may consider first the crank shaft, built up, or solid, in a single section, or divided into two or three parts. For crank pins under eight inches in diameter the crank shaft should unquestionably be solid and the built up shaft is not often considered for pins under ten inches in diameter. In the large sizes the built up shaft is not only successful but almost the only profitable means of commercial production. Shop facilities have a very direct bearing on this problem, for the equipment for forging large shafts is expensive and the work is cumbersome, while many shops can readily handle the individual parts required for a built up shaft of large diameter, and a lathe of sufficient size to handle the completed shaft is the only special requirement. No keys or pins should be used in the built up construction, for a good shrink fit will not require such assistance, and no key or pin will hold a poor fit. More important, the key or pin creates a point or line of incipient failure. Most of our engines have solid shafts, since large cylinder diameters or long strokes are not common. The shafts are usually secured from concerns specializing in this work. The solid shaft is the better but more expensive construction.

Regarding the division of the crank shaft into two or more sections, this is highly advisable for

both manufacturing and repair reasons, in six and eight cylinder engines. There is one prominent builder, however, who insists upon the one piece shaft, his stand being that it is the duty of a properly designed shaft not to break. Unfortunately, we cannot always know what the inside of our steel is like, nor can we prevent occasional explosions of some violence in the cylinders. Crank shafts are liable under normal service to failure, though it is a rare accident, and it is a serious matter at sea to dismantle an entire engine and handle a full length shaft. The divided shaft is clearly advisable against that difficulty, as well as for ordinary handling; and, also, it is cheaper to construct. The two halves should be made symmetrical if possible, to reduce the number of spare parts required. The American designer adheres to the sectional shaft and some have kept the matter of symmetry in mind. Often the air compressor cranks are on a separate section to preserve this symmetry.

The bed-plate and housing bring up this same problem of division. In marine service, lightness coupled with great rigidity is essential. The heavy foundations possible in stationary work are, of course, not found on shipboard, but for six and eight cylinder engines, and even for four cylinders, the bed-plate becomes, as a single casting, extremely heavy and clumsy to handle, and also expensive to cast. We have, therefore, generally adopted the practice of dividing both bed-plate and housing. Occasionally the housing is a single casting on a divided bed-plate. A properly designed, bolted and centered joint can be made almost as rigid and strong as a solid casting. The same builder who prefers the solid crank shaft prefers also the one piece bed-plate and housing. Another manufacturer divides his bed-plate and housing into one section for each two cylinders. This is partly explained by the fact that the engine operates on the two stroke cycle and employs the step piston for scavenging, so that one cylinder receives its scavenging air from the adjacent cylinder. This makes a complete unit of two cylinders.

Cylinders should be constructed with separate liners, even in small sizes, for one of the principal causes of cracked cylinders is in the stresses resulting from casting and from the extreme temperature differences during operation. The opportunity for this stressing is increased to a dangerous point in attempting to make the liner and jacket in one piece. If the head is a separate piece, then the liner and jacket are tied together at the top and bottom. The liner always expands more than the jacket and induces tremendous stress at the danger point—namely, the wall of the combustion space. If the head is cast integral with the liner and jacket to avoid tying the liner and jacket together at the circumference of the combustion space, as has sometimes been recommended, then the stress is thrown on a much more unfortunate part—namely, the valve openings. We, in America, adhere in general to the separate liner, almost entirely so in large sizes; but a few firms make the castings integral in cylinders even over twelve inches in diameter.

The cylinder head has been one of the most troublesome parts. A cylinder head must have free and generous water passages between all valve openings and possible bolt holes. Very often, in the desire to get large valves in the cylinder head,

the water passages were too much restricted, with the natural result that the circulation was cut off or greatly reduced at some points and failure soon occurred. "Mud pockets" must be avoided. In a way similar to that in which a steam boiler will give way when sediment collects at a point over the flame, so the cylinder head will crack if the cooling action of the water is interfered with by sediment. A heavy flange is often the cause of failure, since the metal absorbs more heat than it can get rid of, increasing its temperature to a point where the expansion becomes excessive. We have begun to appreciate these points and nearly all recent designs have provided for proper water circulation and have avoided the tendency toward undue storage of heat. The water passages sometimes connect the head with the jacket directly through the flange in order to keep this member cool. There is now one successful cylinder head with seven valves of good size. This shows that the problem is not insurmountable.

The pistons have been another cause of discouragement. If a high compression and output are desired for a given cylinder size, then the pistons must be cooled—at any rate those over fifteen inches in diameter. If one is content with moderate compressions and output, then the pistons need not be cooled, even in large diameters.

There are now at least two firms securing close to 200 horsepower per cylinder who do not cool their pistons, but moderate compressions are used and the jacket is carried well down the side.

Water cooling of the pistons can only be described as "frightfulness." The linkage required is always complicated and there is always leakage. The water usually finds its way into the crank-pit and makes the oil unfit for lubrication. We are generally content to be moderate in our demands and not cool the pistons.

The lubricating systems are force-feed for the higher speed engines or where the utmost reliability is desired, and gravity feed for the slower speed, and, in general, for the larger engines. The latter system is more economical of oil, but one member to be considered with gravity lubrication is the wrist pin. Sometimes grooves only are cut in the piston walls and ducts drilled to the pin. In other cases a slot is cut in the piston and oil squirted into it through the cylinder wall at the proper point in the stroke. Either scheme is open to the serious objection that the moment carbon appears in the oil on the cylinder wall it will pass into the bearing and score or cause overheating.

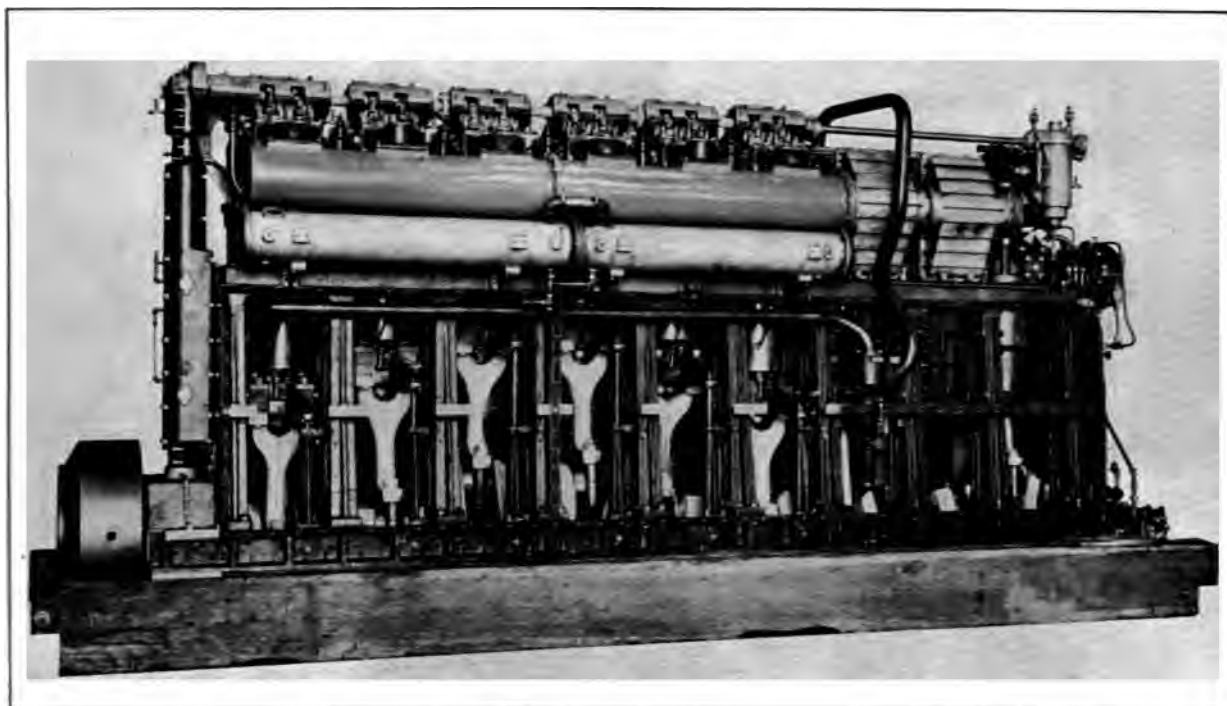
The wrist pin carries the highest bearing pressure and has the least motion of any of the principal bearings. It should, therefore, receive the best lubrication. With the gravity system it is possible to make use of the centrifugal action on the up stroke of the connecting rod to force oil up a tube attached to the rod and thence to the pin. There must be, of course, a check valve in the lower end of this tube. This is one solution of the difficulty. We are inclined to use the gravity system wherever possible, and this must, therefore, receive close attention in an engine so equipped.

The air compressor is a topic demanding too much space to be considered in detail here. We use both two and three stage compressors, and, with but few exceptions and those on very large engines, they are directly connected to the crank

shaft. For pressures near and above 1000 pounds per square inch, three stage compression is more reliable. Inter and after cooling is essential, particularly to avoid the danger of explosion. Many accidents have occurred here and abroad due to explosions in the compressor and air lines. If lubrication is too generous the air compressor is nothing more than a small Diesel engine, but with very much higher pressures we are inclined to use automatic poppet valves, although they are extremely noisy and decrease the volumetric efficiency of the compressor more than the plate or finger valves. The latter have met with considerable success abroad. The final solution of the air compressor will be its elimination. It absorbs from four to eight per cent of the total horsepower and is one of the greatest sources of trouble. Excellent progress is being made toward this end.

In the matter of valves, there seems to be very little unity of judgment. There are, in American

Diesel engines which have this arrangement. This is the simplest scheme possible, but the two stroke cycle engine does not develop sufficient additional power over a four stroke cycle engine to compensate for the high fuel consumption and difficulties with scavenging, especially in large powers. In one of the Diesel engines mentioned, a cut off valve in the scavenging ducts is necessary. In Diesel practice we see more of the five vertical valves in the head than any other arrangement and in the surface-ignition designs the single fuel valve with port exhaust and scavenging is commonest. The elimination or simplification of the cam-shafts, push-rods and rocker arms necessary to operate the valves, by the use of the fuel valve only, is a great advantage. The engine mentioned which had eight valves per cylinder required seven cam and auxiliary shafts, and on one shaft there were eight cams per cylinder to operate six of the valves in the head. But this is an extreme case.



A Type of Marine Heavy Oil Engine

designs, both horizontal and vertical valves and anywhere from one to eight in number for one cylinder. There are a few examples of multiple valves—that is, more than one valve for either exhaust or intake—and there is one example of auxiliary valves outside of the exhaust ports and one example outside of the scavenger ports. The simplest arrangement for a four-cycle engine is one exhaust valve, one intake valve, one fuel valve, one air starting valve, and one safety valve. There is one four stroke cycle engine which has two exhaust valves, two intake valves, one fuel valve, one air valve, one air starting valve and one safety valve all in the cylinder head and also an auxiliary exhaust valves, two intake valves, one fuel valve, one air starting valve and one safety valve all in the cylinder head, and also an auxiliary engines which have only one valve, the fuel valve, in the cylinder. Exhausting and intake of air are accomplished by means of ports. There are two

The overhead cam-shaft with vertical valves is usually the simplest construction, although the tendency in this country is toward the cam-shaft at the base of the cylinder operating the valves thru push rods and rocker arms.

Fuel valves, the injection of oil and the shape of the combustion space are related subjects covering too much ground to be treated in detail here. In general the "closed valve" for air injection is used in this country. In this type both oil and air lie behind the needle valve. Upon opening the needle valve the air blows the oil through atomizing plates and the nozzle, usually a bell-mouthed aperture of very small diameter. There are many ingenious schemes in use in this country for aiding in the pulverization of the oil, but a great deal of this work has been paper theorizing. A newly developed surface ignition engine was mentioned which holds great promise. The success so far obtained has been the result of open-minded and thorough study of injection conditions.

Shipbuilding in British Columbia

AS recently as June, 1917, when the Foundation Company of British Columbia, Ltd., a subsidiary concern to the Foundation Company of New York and Montreal, and controlling vast engineering and constructional enterprises in the United States and Canada, undertook to build wooden steamships of 2500 tons register to the order of the Imperial Munitions Board, practically the whole of the Songhee Reserve constituted a barren and unproductive area. Here a ship-

at Victoria. It is proposed to complete this large contract within fifteen months, and, with a view to facilitating construction, some 4000 men will ultimately be employed at a weekly payroll of \$175,000.

Two four-way yards, known as Point Hope and Point Ellice, are being utilized for the handling of the new contract, and the eight shipways will be continuously occupied until the twenty ships are completed.

The plant and equipment have been purchased outright by the Foundation Company from the Imperial Munitions Board, and a two-year lease of the shipbuilding sites has been secured from the British Columbia government. By its acquisition of the Point Hope and Point Ellice shipyards, the



Bayly Hipkins, Fourth Vice-President of the Foundation Company and Manager of their interests on the Pacific Coast. Launching scene at the Victoria yard of this company.



yard for construction of wooden vessels was prepared, and construction followed at once, the first wooden steamer, the "War Songhee," being laid down August 2nd, 1917, and launched in 120 working days—a very creditable record for a new yard. The other four hulls followed in rapid succession, the "War Nanoose," last of the five, being launched September 9th, 1918.

Coincident with the completion of the Imperial Munition Board's contract, the Foundation Company, on August 20th last, secured an order from the French government for the construction of twenty 3000-ton full-powered wooden steamships

company now controls the most up-to-date wooden shipbuilding plant in British Columbia. In fact, there are few, if any, better equipped on the entire Pacific seaboard.

Twenty days after the new contract had been signed in New York by the French High Commissioner, the first keel was laid down at the Point Hope plant. Twenty thousand people participated in the memorable event staged on September 9th. The keel-laying ceremonies were inaugurated at the Point Ellice yard, where Hon. John Oliver, Premier of British Columbia, and Dr. Simon Tolmie, member for Victoria in the federal parliament

at Ottawa, indulged in a spike-driving contest, in which both displayed considerable prowess. Addresses dealing with the significance of the occasion were delivered by Bayly Hipkins, vice-president and Pacific Coast manager of the Foundation Company; Premier Oliver, Dr. Simon Tolmie, Hon. John Hart, minister of finance for British Columbia, who played a conspicuous part in the negotiations which resulted in the landing of the contract at Victoria; A. E. Todd, mayor of Victoria; Capt. Hirsch, representative of the French government, and French Consul A. O. P. Francis. A big feature of the celebration was the appearance of the Portland shipyard band, and the debut of the Victoria shipyard band.

Immediately following the keel-laying at the Point Hope plant, the wooden steamship "War Nanoose," the last of the vessels built by the company for the Imperial Munitions Board, was launched. A pleasing feature of the launching was the adoption of the ancient but picturesque Japanese custom of releasing carrier pigeons from the fore-

tion of twenty ships on the eight ways in fifteen months—a tall order in view of the fact that it took the Tacoma yard of the company eighteen months to build the same number on ten ways. The Foundation spirit has caught on in Victoria, and other yards will have to look to their laurels. Everything points to efficiency, and speed-up is the popular slogan.

Two experienced shipbuilders are in charge of hull construction. Kenneth Macpherson, who hails from the world's hub of shipbuilding, the Clyde, is yard superintendent at Point Hope, and Bill McGregor, who formerly had charge of the construction ships at Portland Portland, has the Point Ellice plant under his wing. The company is pitting the two four-ay yards against each other with the object of promoting friendly rivalry, and with the opposing yards operating at the highest pitch of efficiency, it naturally follows that the competition will be keen.

Eight keels are already down, and the square framing is well advanced on the initial hulls. The



castle head, and the strewing of flowers overboard as the traditional bottle of champagne was smashed across the bows, signaling the departure of the ship on her downward course.

The Victoria organization is a live one, with H. B. Pickering, a shipbuilder of wide experience in both wooden and steel ship construction, in charge of both plants. Mr. Pickering is a wizard of organization who is out to make the Victoria plant second to none on the Pacific Coast. The Victoria manager is an enthusiastic shipbuilder, and his enthusiasm is infectious. Since taking over the reins of office, he has made himself solid with the workers, who have become thoroughly inoculated with the speed-up serum. The program of the Foundation Company in Victoria calls for the construc-

Launch of the "War Nanoose" at the Point Hope yard. H. B. Pickering, Manager of Foundation Company's plants at Victoria, B. C.

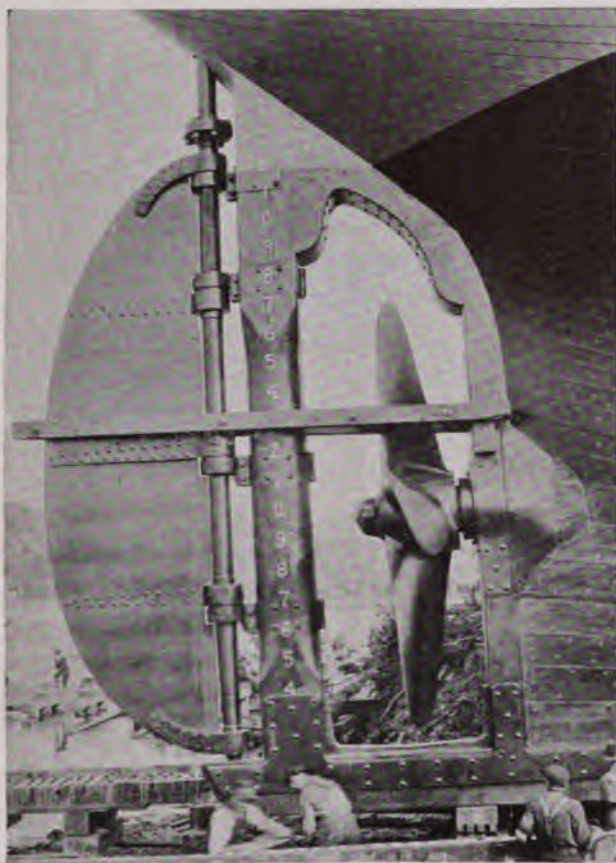


schedule as outlined calls for the launching of two hulls in January, and subsequently a new vessel for France will take to the water every two weeks.

The steamships building at Victoria will be 293 feet over all, 47.6 feet beam, 21.9 feet deep, and will have a deadweight carrying capacity of 3000 tons. The propelling power will consist of twin triple-expansion engines of 550 horsepower each, giving an ordinary sea speed of eleven knots. A distinct

feature in the construction of these boats will be a reinforcing center-line steel truss running fore and aft, and extending from keelsons to deck. The vessels will be completed and equipped with machinery at the company's yards at Victoria. Preference will be given to local engineering plants for the supplying of boilers, engines and auxiliary machinery, and contracts have already been placed with various firms so that early delivery of machinery is guaranteed.

The Foundation yard at Victoria has its shipyard band, and its own newspaper, known as Ship-



Above rudder of steel boiler plate and 14'6" propeller manufactured by Yarrows, Ltd., of Esquimalt, B. C., for the "War Nanoose." Right "War Nanoose" taking to the water at Point Hope plant.



yard Shavings published weekly by the employees. The object of the newsy organ is to boost fellowship and promote co-operation between employee and employer.

CONCRETE SHIPS TO BE BUILT SOON

The work of pouring the keels of the concrete ships at the new concrete shipyards at Government Island will begin before the end of the month, as the yard is nearly completed, including the various shops and warehouses. The first ship will be a 7500-ton cargo carrier, and work will start on a second ship immediately. The yard force at present comprises 600, and a physician and full hospital equipment have been installed.

INSURANCE IN RUSSIA

We have received an interesting communication from Mr. M. Fourman, who has now returned from a mission to Petrograd, Moscow and other Russian centers of business. Some of the leading Russian insurance companies operating in this country felt it was necessary for their guidance that they should have first-hand information as to the position of Russian insurance business under the Bolshevik rule; the extent to which financial disorganization prevails, and the future prospects of insurance business between Russia and this country and the Allies. The companies immediately concerned were the Volga Insurance Company, Limited, of Petrograd; the Russian Insurance Company of 1867, Limited, of Petrograd; the Eastern Insurance Company, Limited; the Commercial Insurance Company, Limited, of Moscow; the "Russ" Insurance Company, Limited, of Petrograd, and the Russian Mutual Life Insurance Company, Limited, of Petrograd; and it was as the representative of these that Mr. Fourman made his investigations. A personal visit was all the more necessary, as, owing to the cessation of all postal and telegraphic communication between Russia and this country for some months past, all the London branches of Russian insurance companies were completely cut off from their head offices, and were ignorant of their present situation. The commissioner reports that on arriving in Petrograd and Moscow he was pleasantly surprised to find that all the Russian insurance companies were carrying on their business free from

any interference from Bolshevik reformers. In fact, Russian insurance business, he says, is at present the one bright spot in the Russian business situation. The escape of Russian insurance companies from the "control" of the Bolsheviks, who controlled to the death many other branches of Russian commerce and industry, can, Mr. Fourman says, be easily explained by the fact that the insurance companies act as guarantors of vital interests of millions of Russian citizens and thousands of public institutions, and that, in the atmosphere of uncertainty and anxiety existing in Russia, the need for their services and the scope for their useful activities were never so great at the present moment.—From "The Syren and Shipping."

Side Launching of Ships on the Great Lakes

(Read at the twenty-sixth general meeting of the Society of Naval Architects and Marine Engineers held in Philadelphia, November 14 and 15, 1918)

By Edward Hopkins, Member

THE preparation of the ground for building ships that are to be side launched is much the same as for ships built for end launching, with the exception that the ship is on a level keel when building. This is considered by lake shipbuilders as a great advantage, not only for general accessibility and the saving of scaffolding, and blocking, but everything is plumb from the keel, which being level no rake has to be considered.

As most of the ships are built on permanent berths, and as these berths run from 80 to 100 feet in width, this, with the inclination of the ways, usually from $1\frac{1}{4}$ inches to $1\frac{1}{2}$ inches to the foot, assures a height of keel blocking from 4 to 5 feet, which gives good working room under the ship's bottom.

There are no extensive launching calculations required for side launching. The accompanying plates illustrate how uniformly the ship is borne at all periods, and the time from releasing of the vessel until afloat is so short that no undue stress is placed upon the structure. Of course the necessary calculations for stability after launching is determined, no matter what method is adopted.

Side launching is especially adapted for repair yards where the graving dry docks are used for launching ships.

The methods used and arrangement of the building berths for side launching are, for all practical purposes, the same in all lake shipyards. The methods and arrangements used by the Toledo Shipbuilding Company are taken examples in this description. The berths used are of the usual type, with piling and timber shoring stringers, and supports for the ground ways, which are usually of oak or fir. They are placed between the keel blocks about 10-foot centers, extending from the inside bilge to the water's edge.

On the concrete ground ways the lower half is covered with oak flitch six inches thick, forming the ground way. The upper half is of the usual size timber launching way and is hinged about the center of the berth, so that it can be dropped down until needed for launching, giving free access to the space below the ship's bottom.

The arrangement of the ways and launching tables are for a ship of 3,500 tons deadweight, of the type now building by this company for the Emergency Fleet Corporation. The dimensions of the ship are as follows: Length overall, 261 feet; beam, 43 feet 6 inches; depth, 21 feet. The length and beam are the maximum that can go through the canals from the lakes to the sea.

While the time required for side launching is very short, the launch is much more spectacular

With the advent of iron and steel shipbuilding on the Great Lakes, together with the fact that the location of most of the yards was not advantageous for end launching, though occasionally small vessels are launched endwise, side launching has been adopted and has continued to the present day, and is receiving consideration and has been adopted in some new yards that have been established outside of the lake district.

than an end launch, there being usually a drop of from one to three feet off the end of the ways.

In a recent launching in one of the lake yards, the drop from the end of the ways to the water was only one inch less than fourteen feet. No damage resulted to the hull structure.

About three weeks before the date set for a launch the groundways are placed, and a week later the packing is placed under the ship. The triggers and daggers, two sets at each end for a

ship of this size, are put in position a week before the launch, and three days before launching two patent key-blocks are placed under the keel at each end, these being the last keel blocks left under the vessel and assist in relieving the stress on the triggers until the last moment.

The triggers are levers, two at each end, pivoted against chocks secured to the groundways. Daggers or shores extend from a point on the trigger just clear of the chocks to the ship. At the other end of the triggers, bights of rope are turned, extending back and fastened to piles or other secure anchorage. These ropes are cut with axes by men when signaled. The triggers and daggers drop away and the ship is free to move.

The signal device used consists of three vertical semaphores, pivoted to a platform located at each end of the ship, on the lower or water side of the building berth and clear of the ship's way, in sight of each other and also in sight of the men who are to cut the ropes, holding the triggers.

About half an hour before launching, the wedging up or rallying is started; first on the upper or land side until the shores drop out, then on the lower side until the shores drop out; then again on the lower side, rolling the ship so that the keel blocks can be easily removed. The patent or key-blocks, as before stated, are removed last.

The first of the semaphore signals is dropped when all the shore and keel blocks are out, the second when the key blocks are out. Usually, at this period of the operations, the ship has moved a little, which is followed up by the jack shores fitted at each end of the ship. If she has not moved, the jacks are worked until she moves. The ship is now ready to let go, and the last signal is dropped to cut the ropes, which is done simultaneously at both ends.

The data from launch of the 3,500 deadweight ton ship are as follows: Declivity of ways, $1\frac{1}{2}$ inches per foot; launching weight, 1,170 tons; area of sliding ways, 289.5 square feet; tons, weight per square foot, 4 (will go as high as 9 to 11 on large ships); time from start to leaving ways, 6.5 seconds; velocity in feet per second, 9.08 feet.

Marine Insurance Notes

Loss of the "A. J. Fuller"

ON October 30, last, at about 1:30 a. m., the ship "A. J. Fuller", while moored at Municipal Buoy No. 2 in Elliott Bay (Seattle), was run onto and sunk by the Japanese steamer "Mexico Maru", then on passage from Seattle to Tacoma. There is the usual conflict of testimony by the witnesses on either side, one side claiming that the night was clear and the lights on either side of the bay could be clearly seen, while on the other side it is claimed that the weather was hazy and that those on the ship should have rung a bell or made some noise to indicate her presence. The fault for the collision will be settled by the courts for the owners of the ship and her cargo have libeled the "Mexico Maru" for the sum of \$750,000, claiming for the value of the cargo and the personal effects the sum of \$500,000 and for the value of the ship \$250,000.

The ship was built in 1878 and had a deadweight capacity of 2600 tons. She was well kept up and despite her age was considered more staunch than the "record built" ships which are now being turned out under Government contract.

The loss of the cargo, aside of the money value, is very serious. Nearly one million cans of salmon, a large part of which had been commandeered by the Government, and 4000 barrels of salt fish, is not to be lightly considered in these days of conservation of food products, when it is necessary to feed not only ourselves and the allies, but the starving people of our erstwhile enemies.

The prospects of salvage are not bright. The ship has been located at a depth of about forty fathoms of water, a depth in which divers cannot work, but there are many with methods which "cannot fail" who are making proposals for the salvage of ship and cargo, and it is anticipated at this writing that some "no cure, no pay" contract will be accepted by the underwriters and the owners. If so, it will be on such terms that, should the contractors be successful, they will probably reap a reward commensurate with the risks they will run.

One interesting test was made to ascertain the probable damage to the canned salmon by the pressure of the water. Three cans were sunk to a depth of twenty-five fathoms, and on being brought to the surface the sides of the cans were found to be badly dented, but the soldered seams around the top did not open. It is claimed that at a depth of twenty-five fathoms the cans have suffered as much as they would at a depth of forty fathoms, as the contents had become so dense as to make of the can and contents nearly a solid body capable of withstanding a much greater pressure, but this is doubtful. The pressure at a depth of twenty-five fathoms is about 66 pounds per square inch, while at a depth of forty fathoms the pressure would be over 100 pounds per square inch, and that additional pressure would, of necessity, have a considerable effect. However that may be, should the cargo be recovered, there will undoubtedly be a considerable salvage.

Wreck of the "Princess Sophia"

THE Br. Str. "Princess Sophia", bound from ports in Southeastern Alaska for Vancouver, went ashore on the morning of October 24 on Vanderbilt reef, near Sentinel Island, Alaska, and after laying there for about forty hours slid off into deep water and sank, carrying with her all of her passengers and crew, numbering over 300, not one of whom survived. This appalling loss of life makes the tragedy the worst that has happened on this coast, and the fact that there was not a single survivor gives to it an unique horror, in that relatives and friends of those lost can never know just how or why death came.

The steamer ran ashore at about 3:10 a. m. on October 24, during a heavy gale which was driving before it a blinding snow storm. She apparently rested solidly on the reef, for the messages received from her by wireless stated that there was no danger of her sinking or sliding off into deep water. Several launches were at the scene during the forenoon, and while it might have been possible to have transferred some of the passengers during that day it would have been extremely hazardous and lives would undoubtedly have been lost, for the gale still continued, and from the position in which the steamer lay on the rocks it would have been impossible to launch boats either on the lee or weather side and to launch them from bow or stern with the sea sweeping by would have placed the passengers apparently in much greater danger than they were while on board. During the 25th the gale and sea increased in violence and a heavy snowstorm prevailed. The ship had not been moved from her position, was apparently firmly fixed, and no effort was made to transfer the passengers, as it appeared to those in the vicinity almost certain death to do so. The first intimation of any serious trouble was at about 4:50 p. m., when a wireless call was picked up that the steamer was foundering. At that time it was too stormy and thick with snow for any of the small boats in the vicinity to attempt any rescue or even to find the wreck.

No messages have been published to show that the steamer was pounding on the reef. Evidently she was, for at 8:30 p. m. on the 24th the lights went out, stated to have been caused by the breaking of the main steam throttle, which would indicate that she was at least straining. Reports received showed that she was not making any water the first day. The sudden end certainly shows that she must have strained badly, and on the rising tide during the afternoon of the 25th she must have pounded so heavily as to seriously damage the bottom as well as the tank tops, thus allowing her to fill quickly. When the rescue boats could get near enough to pick up the bodies still afloat, large quantities of fuel oil were seen and the clothing that covered the bodies was saturated with the oil. This perhaps caused the death of some who might otherwise have survived, but it is doubtful if any could have withstood the icy cold water or exposure to the freezing atmosphere.

The story as to how the accident occurred will

never be told. But whether or not the captain was running at too great a speed in thick weather; whether or not he over-run or under-run his course; whether or not some current set him out of his reckoning, the fact remains that a friendly light might have been the means of indicating to the master his position and thus avoided the accident entirely and saved the many lives that were lost.

The inside passages of Alaska make one of the most beautiful pleasure trips to be found throughout the world and are a lure to many travellers. Trade with Alaska is growing steadily and traffic is greater each succeeding year. Too many accidents and tragedies have occurred in Alaskan waters through the lack of lights and other aids to navigation, and Alaska, as a valuable territory of the United States, Alaska as a producer of wealth in food and mineral products, Alaska as a source of pleasure to many people, not only of the United States but of the world, should and must have the best aids to safety in navigation that the United States can furnish. Alaska cannot be reached by rail routes, and its water routes should be most carefully safeguarded.

GASTON, WILLIAMS & WIGMORE SECOND ANNUAL REPORT

In submitting to the stockholders the second annual report of the company, the board of directors

desires to call attention to the policy which has been adopted by the officers of the corporation. Russian accounts amounting to \$1,751,309 have been written off. This action was taken after careful consideration of the unsettled conditions existing in Russia.

During a large portion of the past fiscal year the operations of the company have been restricted by its careful and willing compliance with those governmental regulations which the participation of our country in the war has made necessary. It is to be anticipated that these conditions will continue with increasing severity until peace is declared, and it will therefore be our aim to carefully conserve the resources of the company in the most liquid condition possible.

The following items showing the volume of the company's business during the period from May 1, 1917, to April 30, 1918, are presented for the information of the stockholders. The total volume of export and import sales of Gaston, Williams & Wigmore, Inc., amounted to \$57,537,991.06. Unfilled orders at the close of the fiscal year totalled \$16,727,942.20.

The issue of \$2,500,000 of bonds of Gaston, Williams & Wigmore Steamship Corporation mentioned in the last annual report has been paid in full by that company during the year.

Los Angeles Maritime Activities

Shipping

WITH peace in close view, shipping men everywhere are laying plans for securing foreign trade, and Los Angeles as usual is very much alive to grasp her opportunity. Importers, traffic managers, dock superintendents and shipbuilders are all united to exploit the trade with South and Central American ports which was prior to the war almost a German monopoly. One company announces that during the last month some 4000 tons of freight for Southern ports has been handled over its wharf.

J. E. Marshall, traffic manager of the Outer Harbor Dock & Wharf Company, was unusually optimistic over foreign trade prospects, declaring that within the next eight months steamers from every port in the world would be arriving and departing from Los Angeles.

"There is," said Marshall, "an excellent opportunity at the present time to further develop our trade with Mexico, Central America and South America." The export trade is growing. Los Angeles merchants have had representatives in Latin America, and many orders for various lines of merchandise are being received through their efforts. Many German firms in South America are being forced into bankruptcy by the prejudice against their nationality, and Los Angeles will get its share of their business. Cargoes of cement and potash manufactured here have been shipped.

Shipbuilding

Fred Baker, president of the Los Angeles Shipbuilding & Dry Dock Company, announces that Fred A. Gardner of San Francisco, although still interested financially, has retired from active management, and that the administration of the company is being thoroughly reorganized.

Dredging for the new \$1,000,000 dry dock in the West Basin is well under way. One million, three hundred thousand cubic yards of silt are to be moved to make room for this much-needed improvement, which will be able to dock vessels up to 10,000 tons deadweight. Harbor engineers are now constructing bulkheads to retain the silt pumped from the basin by the United States Government dredger. The necessity for a dry dock in Los Angeles harbor has been steadily growing, and this project was financed by local capital, the only government aid being an appropriation to cover the expense of dredging. The steamer Fairhaven put into port last week with the Mexican steamer Morellos in tow, and had to leave port with her tow for San Francisco, because there was no dock here of sufficient capacity to handle the damaged vessel. This is only one such incident out of many that serve to show the disadvantage of insufficient equipment at deep water ports.

The Los Angeles Shipbuilding & Dry Dock Company has made an appropriation of \$20,000 for a Y. M. C. A. building for employees, and one thousand of the men have agreed to give their time in the construction. A building committee has been appointed, preliminary plans prepared, and work will start immediately.

According to the survey of housing conditions made by the United States Department of Labor, there are over 500 men, women and children living in tents in the vicinity of the harbor district, and more than 10,000 men spend two and a half hours daily on the cars. These conditions are caused by scarcity of houses. Many large projects to relieve this condition are now under way, and before winter the housing of the shipbuilding employees will be in much better shape.

Noah's Ark

By the Late G. W. Dickie

WHEN I was requested to write an article on Noah's Ark I was at first in doubt as to the subject furnishing material enough resting to the paper, but as I began to dig into the old stories and this, the oldest ship of which there is any authentic record, interest-developed out of the possibility of to construct an article that might interest, if not instruct the reader.



In the story by Moses, Noah, who evidently knew enough about shipbuilding to be able to carry out the interest and meaning of the order as it was given to him, is represented as receiving the specifications for this great antediluvian ship from the great Architect of the Universe Himself; the simplicity and clear descriptive expression might be copied with advantage by naval architects of our time. "Make thee an ark of gopher wood, rooms shalt thou make in the ark and shalt pitch it within and without with pitch. And this is the fashion which thou shalt make it of. The length of the ark shall be Three Hundred Cubits (450 feet) the breadth of it Fifty Cubits (75 feet) and the height of it Thirty Cubits (45 feet). A win-

dow shalt thou make in the ark, and in a cubit shalt thou finish it above; and the door of the ark shalt thou set in the side thereof. With lower, second and third stories shalt thou make it."

It has been sometimes suggested, and we often see pictures originating in the suggestion that the ark was a huge raft, with a superstructure or house built on it, of the dimensions given in the specification, like the house boats we use today. There is not the slightest reason that I can see for concurring with this suggestion. On the contrary, the Genesis account of the structure of the ark is so perfect in detail, that we have no right to suppose that the specification of the most important part of it, the supposed raft to which its power of floating would have been due, would have been omitted. Moreover, the whole account reads for just what it is, a very correct description of a ship-shaped structure. The ark was a vessel of such dimensions that the mere fact that it was constructed argues a very advanced knowledge and experience in the constructive art on the part of the contemporaries of Noah.

Let us see what we can make out of the specification for building this great ship. "Make thee an ark of gopher wood." We cannot say today just what kind of wood this was. When Moses read his story first to the Hebrew people they must have known what was meant. They were acquainted with the boats used on the Nile, some of which were of considerable size, and the suitability of the wood was accepted by them and needed no comment. For a ship that was to be adrift on an ocean for about a year, with considerable of a load to carry, the structure



The architect who built this ark was not so wise as Noah. He put too much coin into the superstructure

must have been of a substantial character, requiring a large amount of gopher wood near the place where Noah built his ship, figuring a reasonable thickness of skin and scantlings of timbers, beams and planking for the three decks. Noah had to collect for this undertaking 4,153,500 feet of gopher wood. "Rooms shalt thou make in the ark." There would be a number of family rooms necessary between the upper and shelter decks. Then between the main and upper decks there would be accommodation for the many different kinds of animals representing the living creatures occupying that part of the world that man had been able so far to bring under his dominion. While the lower between decks and the hold would be fitted to receive the stores necessary for a year's subsistence for such a living cargo. All this subdivision was necessary not only for convenience and comfort, but to give the necessary strength to the structure as a whole.

"And shalt pitch it within and without with pitch." This, I figure, required about five hundred tons of bitumen. This would suggest the Chaldean country as the site of this shipbuilding enterprise. In the Chaldean account of the ark on the tablets recovered from the ruins of Nineveh, the ark is also coated with bitumen or pitch, of which there was an abundance in that country, although the Bible account would indicate that the antediluvian people lived to the northeast of the Euphrates valley.

The specification next gives the fashion and dimensions of the ark—length 450 feet (taking the cubit at 18 inches), breadth of beam 75 feet, height 45 feet. The word height used in the specification is taken by those who suppose a great raft with a house on it to mean the height of the house. No naval architect would make this mistake, if the depth of hold had been given, measured from the

shelter deck down to the inner skin of the bottom, the word depth would have been used, but the dimensions here given is what the naval architect calls the moulded depth, which is measured up from a level line under the bottom to another level line from the top of the deck, and is really the height of the ship.

The precise shape of the ark has been the subject of no little controversy. The Hebrew word for it is apparently Egyptian and is translated in the Greek version by the word for a wooden box, chest or coffer. Whoever has seen an Egyptian mummy knows that the coffin or chest in which it lies is like a long boat, and has near the proportions of the ark.

At the time of the truce between the Spaniards and the Dutch in 1609, there lived at Hoorn, in the North Holland, a Mennonist, Peter Jansen, by name, who took the notion that he would build a ship of the same proportion as Noah's ark, only smaller, that is, 120 feet

long, 20 feet beam and 12 feet high. While it was building everyone laughed at him, but Dutchman-like, he kept sturdily on, and found in the end that it justified his expectations, for when launched it proved to be superior to any of the other ships of the time. The result was that the Dutch built many others like it, calling them Noah's Arks—in fact they have been the typical canal boat ever since.

It is also a curious fact that our modern dread-

noughts are practically the same dimensions as Noah's Ark only with sharper ends, as they have to make great speed, while Noah's ship had only to drift. The finished weight of Noah's Ark with clean swept hold, if I am correct about the thickness of materials in the hull, would be about 8,300 tons, and if her ends were shaped as I think they were, she drew 9 feet 2 inches light and if loaded to 30 feet draft, which would leave 15 feet free board, she would take a



This junk might have lightened the ark

NOAH & SONS, LIMITED, SHIPBUILDERS
First Emergency Fleet Corporation
(With Editor's Apology to Walt Whitman)

Five thousand years before the times of Hurley, Schwab or Piez, Old Noah built a record ship from wood of gopher trees. Associated on the job were Japhet, Ham and Shem. To fill their contract took some "pep," but it was up to them. Far greater architect had they than Ferris, Hough or Ward, no board inspectors e'er disturbed the men in Noah's yard. If Union Labor at this work got seven cents a day, they thought old Noah quite an ass for giving them such pay. She was not burdened with a name from Mrs. Wilson's Sires; no charming maiden at her bows a champagne bottle fires. And yet from off her ways she floats with eighteen thousand tons and all the bold progenitors of Allies and of Huns. If hull of U. S. Shipping Board this record can dispute, let her get up full head of steam, we'd like to hear her toot.

deadweight cargo of 18,500 tons, while her gross register tonnage would be about 14,000. This would appear to be about right for the work this ship had to do.

"A window shalt thou make in the ark, and in a cubit shalt thou finish it above." This is a specification of the type of window that Noah was to fit for the rooms in the second and third stories, or between decks—the size 18 inches square is just right for a room on the upper decks in a modern ship. "And the door of the ark shalt thou set in the side thereof." This is the cargo port, and would be large enough to pass any animal and all stores required. This vessel was to be loaded in the shipbuilder's yard, did not require to be launched, so this cargo port could be placed below the main deck, with a gangway from the ground at such a slope as to make the handling of the cargo easy. This providing of a cargo port in the side of the ark has always been to me an evidence of wisdom in the design. This, coupled with the fact that the dimensions are such that the weight of stores in the hold could be worked out as time went on and still the great stability

of the ark would make her safe, has always been a wonder to me. "With lower second and third stories shalt thou make it." I have always figured that the bottom of the ship was three feet in thickness, that she had 21 feet depth of hold and 10 feet between decks, which would make the lower second and third stories as required.

George C. V. Holmes in his book on ancient and modern ships says that if the date usually assigned for the Deluge be accepted as correct, then pictures of vessels have been discovered in Egypt immensely older than the ark, and he gives as the most ancient mention of a ship in the world's history as found in the name of the Eighth King of Egypt after Mena, the founder of the royal race. This king was called Beton, which signifies the "prow of a ship," which he thinks would indicate that there were ships in Egypt between the years of 5000 and 6000 B. C. There is no doubt but that the Egyptians early learned the art of boat building, but what may be accepted as correct for the first King of Egypt, the date must be placed at an earlier date. In the table of nations descended from Noah, as given in chapter of Genesis, the name of the second son of Ham, the son of Noah, was that given to "the two Egypts" from the oldest times among all Semetic nations. Seven races or sons are given to Mizrain, all of whom represent the people that settled Egypt and Northern Africa.

As to the date described to Mena or Menes, Bocckh gives the date of the reign of Menes, who is universally recognized as the first King of Egypt, at 5702 years before Christ. Unger, another great German scholar, preferred the year 5613 B. C. Marietta Bez strikes off the odd centuries and places Menes 5004 years B. C. Masporo thinks the year 4500 about the proper date. Depsius and Ebers, master and disciple, both famous Egyptologists, think that Menes reigned 3892 years B. C. The Chevalier Bunsen at first gave the year 3623 to him, but later thought the year 3050 more correct. Dr. Birch, head of the Egyptian Department in the British Museum, says about the year 3000 B. C. Mr. Reginald Stuart Poole, devoted to Egyptian studies in the British Museum, thinks the proper date to be the year 2717. While Sir G. Wilkin- sen, whose great book on ancient Egypt entitles him to the highest consideration, agrees in the main with Poole, ascribes the accession of Menes to the year 2691 B. C. These are all distinguished in their special line, yet there is a difference of over 3000 years between their estimates, as if some future historian should say that Mr. Roosevelt was in Egypt during the time that Great Britain was guardian of that country, while another equally famous historian should claim that Mr. Roosevelt was a strong advocate of the justice of the cause of his friend Moses, and would



use his influence with Pharaoh to have the Hebrews set free. So that it may not be necessary to set back the date of the flood or the building of Noah's big ship in order to agree with the things that happened in Egypt after Noah's grandson and his seven great-grandsons settled that country.

Moreover, Egypt, like the other great nations originating in the cradle of the human race, had its story of the flood that had come with the first settlers of the land and the dispersion that took place after the flood, but the flood that Moses tells of and the ship that Noah built argues a very advanced knowledge and experience on the part of its builder and his contemporaries who must have worked on the ship. However little

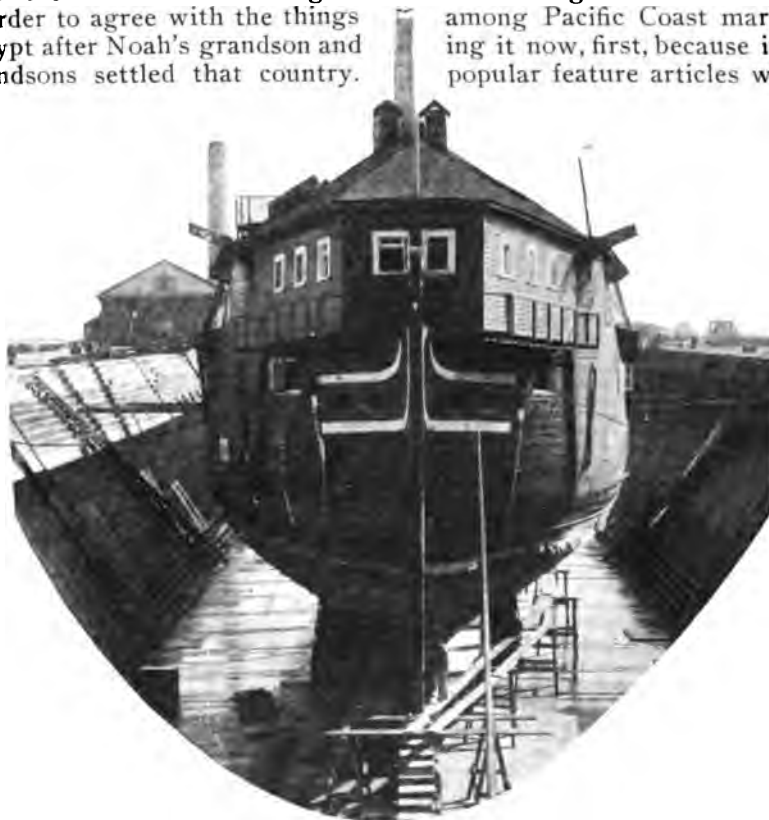
they may have credited his story of the coming deluge, disaster came to them because they could not believe in the wisdom of building ships or any profit in it to the builders. The inability to understand the need of ships is an antediluvian folly that may end in disaster to us.

This article first appeared in the Sunday "Ex-

aminer" several years ago and on account of the prominence of the author as a naval architect and marine engineer caused a great deal of discussion among Pacific Coast mariners. We are reprinting it now, first, because it is in line with several popular feature articles which we have been running in the past

issues and a continuation of which we have in mind in future numbers, and secondly, because it has a direct bearing on the attitude of the popular mind toward the program of wooden shipbuilding. We are being told by every one who does not know anything about shipbuilding except what they have read in the newspapers that wooden shipbuilding is a failure. That an antediluvian patriarch could five thousand years ago, without modern

tools, cranes, the aid of steam, labor unions, or even the United States Shipping Board, build a wooden hull capable of carrying 18,000 deadweight tons proves that the wooden shipbuilding industry is well worth considering as a factor in the carrying trade of the world.—Editor.



The ark in dock

San Francisco Port Changes

The port of San Francisco is to be opened to the maritime commerce of the world on a free ship basis on January 1, 1919. All berthing charges against the ship now in vogue are to be removed. The charge is to be put on the cargo. Existing cargo tolls of five cents a ton will be raised to fifteen cents a ton.

The programme of a complete revolution of the port system of revenue, in practice since San Francisco was a seaport under Government operation, has been announced by the State Board of Harbor Commissioners.

Regular steamship lines, foreign, off-shore and intercoastal, are to be assigned permanent berths only upon the condition that they shall maintain not less than eight regular sailings a year, or at least twelve unscheduled vessels in the trade. That class of shipping is to benefit from a lower rental charge by reducing it about one-fifth the existing dock rentals.

The change to be effected, according to the Harbor Board, will appeal first to the great fleet of unassigned ships, looking the world over for freight charters and always attracted to the port, all things

else being equal, which relieves the ship of the burden of port costs.

In the same connection the Harbor Board will put into effect new rules concerning cargo handling on the docks calculated to reduce to a minimum the dangers of congestion, while measurably increasing the efficiency of the pier system of the port.

To that end and following largely the line of recommendations made by a special committee on port charges and revenue recently made to the board, there will be instituted a new plan of cargo demurrage charges. Steamships will be required to discharge or load a minimum of 500 tons daily, excess time demurrage to be charged in the form of rental for dock use. Cargo is to be removed by consignees as soon as discharged. After five days demurrage will be charged against coastwise cargo and after ten days from discharge of ship on off-shore and foreign cargo.

Application of the rules and regulations touching the removal of delayed cargo on docks will be made more drastic by the board in the reorganization of the entire port charge system.



ON page 73 of the Pacific Marine Review, October issue, there are the following figures: The berthing frontage of San Francisco waterfront is about twelve miles and roughly 7,500,000 tons of vessels were accommodated in 1916. This may mean deadweight tonnage or something else, but it may serve as a basis for approximating the tonnage transferred.

Twelve miles equals 63,360 feet, which, multiplied by 500 (tons), gives 31,680,000 tons which it is possible to transfer yearly. Dividing this by 7,500,000, the present tonnage, would indicate that with the berthing frontage, it would be possible to increase the present tonnage capacity of the waterfront by about four.

The ratio between improved berthing frontage and those unimproved given is about three or four to one—that is, 500 tons to 150 tons. Probably, if the actual useful working berthing frontage was measured, and the short heads of slips and ends of narrow piers, etc., not available for berthing, were subtracted, it would be shown that the present actual tonnage was not far from 150 tons per linear berthing frontage per year, while it is known that 500 tons are possible.

San Francisco, therefore, has a possible transferring tonnage capacity of between 22,500,000 and 30,000,000 tons per annum instead of 7,500,000 tons. The berthing frontage, or the pier waterfront, is ample.

By installing a sufficient number of external cranes for transferring and internal cranes for handling to prevent pier area congestion, there can be attained this 500 tons per linear foot per year.

San Francisco is only about twenty-five per cent efficient. There should not be less than eight external cranes per berth, six each of 2½ tons, and two each of five tons capacity. One or two cranes per berth are of little value. If there are four hatches to the ship, three hatches would be idle or inefficiently worked.

The 120 acres of pier area, considered in connection with twelve miles of berthing frontage, indicates that while the berthing frontage will accommodate 160 ships of a certain length and capacity, yet with the present method of handling on the piers there is only room for the full cargoes of about 90 vessels, tiering to the usual height of five feet. The berthing capacity is therefore nearly double that of the pier area holding capacity.

If external traveling gantry jib cranes are installed so as to unload the cargoes three times as fast as at present, or that three times as many

ships can berth in a definite period of time, then 480 ships can be berthed, while only the cargoes of 90 can be placed on the piers.

By tiering with overhead cranes with adjustable loops which do not occupy any floor space in their operation, so as to increase the holding capacity by four, and by removing the cargoes within twenty-four or forty-eight hours from the piers by drays and the cargoes over the ship's sides upon lighters, the berthing and holding capacities can be balanced and the pier area congestion will disappear.

When the tonnage of the port begins to rise above 20,000,000 tons annually, then the construction of new piers or quays is unavoidable. There is now an excess terminal capacity, provided proper facilities are added.

The above conclusions are only another way of expressing what has already been demonstrated in the excellent reports of the civic and business organizations of the city of San Francisco.

Rogers, Brown & Company, importers and exporters, with headquarters in Seattle, announce that after November 1, 1918, the address of the New York office will be changed from 1916 Corn Exchange Bank building to 44 Cedar street, New York City. The phenomenal growth of the business in New York made necessary immediate additions to the working force and this branch has now 1,100 square feet on the fourteenth floor at the above address. The tremendous development of the New York office of Rogers, Brown & Company is best shown by the fact that it was established in May of this year. The personnel was composed of Mr. Fred M. Chapman, manager, and a stenographer. At the present time the working force consists of Mr. Chapman, two active salesmen, three stenographers, and a bookkeeper and accountant. It is expected that the force will be further increased shortly in order to take care of the growing business.

Thorndyke & Trenholm of Seattle have increased their organization so as to include Portland. This firm is engaged principally in handling the French steam auxiliary schooners that the Foundation Company is delivering to the Republic of France. that templets are brought directly to the park by an inclined runway, and after using are stored in a building at head of park. No templets need be carried more than 300 feet from either mould loft or laying-off park.

The Great Drive on the West Front

THE way in which the West has plunged into the job of shipbuilding, is one of the inspiring things of the war. When the sudden call came for this Nation, whose flag had almost disappeared from the seas, to build an enormous number of ships and to build them as quickly as possible, the Pacific Coast, which owned but a few shipyards, figuratively threw off its coat, rolled up its sleeves and went at it.

Up and down its long length of coast line it could muster only 23 yards. It rapidly established 30 more, brought into the 53 the brawn and muscle of the Pacific Slope and the result—but wait a minute.

There were on September 1, 203 shipyards with 1,020 ways in the the country, most of them new, products of the war. In September the various yards made delivery of 74 ships aggregating 362,635 deadweight tons, a world record. Into this record stepped the hustling western yards with a quota of 37 completed vessels aggregating 209,605 deadweight tons, more than the combined output of the Atlantic, Gulf and Great Lakes shipyards.

"Some of the finest records, perhaps the very finest, of shipbuilding achievement made since we entered this war, have been scored on the Pacific Coast," said Charles M. Schwab, Director General of the Emergency Fleet Corporation, in his San Francisco speech on July 4.

"It was out here in the West that speed records were first made in the shipyards," he said. "Before the war it took from six months to a year to build the largest types of steel ships, but the Pacific Coast cut down this time to 90 days and then to 55 days."

The San Francisco Shipbuilding Company built the first concrete ship propelled by steam in the United States. This is the "Faith," a 5,000 ton cargo carrier now in service. The "Faith" was built for private parties and her success induced the Shipping Board to construct shipyards for the construction of concrete ships. The board now has five shipyards for the production of this type of ship, two on the Pacific Coast, one on San Francisco Bay and one at San Diego, Cal. The three other yards are at Wilmington, N. C., Jacksonville, Fla., and Mobile, Ala.. The present construction program provides for 38 tankers and cargo ships of 7,800 deadweight tons. The first of the Government built concrete ships is scheduled to be launched early in December.

At Seattle, on September 16, 1917, the Skinner & Eddy Corporation delivered the first requisitioned steel vessel taken over by the Shipping Board. This was the "Jeannette Skinner," a cargo vessel of 8,600 deadweight tons. The first contract steel vessel owned by the Shipping Board was also

DELIVERIES BY SECTIONS FROM AUGUST, 1917, TO OCTOBER 1, 1918

	Vessels	Tons
Pacific Coast Shipyards.....	162	1,149,685
Atlantic Coast Shipyards.....	94	678,090
Great Lakes Shipyards.....	139	461,535
Gulf Shipyards	4	14,000
Japan Shipyards	9	73,052
Total	408	2,376,362

delivered at Seattle by the Skinner & Eddy Corporation, on January 5, 1918. This was the 8,571 ton "Western Hero," first named "Seattle."

On May 18, 1918, the first wood ship was launched at Seattle for the board, the "Boulton," 3,500 deadweight tons, and from the same yard, that of Meacham & Babcock, two more were launched on July 4 of a deadweight tonnage of 7,000 tons, and the site of this

yard was a sand dune on year previous.

On May 27, 1918, Kruse & Banks at North Bend, Ore., delivered the first wood ship to the Shipping Board—the "North Bend," 3,500 tons.

As an example of how quickly vessels built on the Pacific Coast and elsewhere by the board are placed in service, the case of the "Quidnic," a 3,500 deadweight ton wood vessel built by Kruse & Banks, North Bend, Ore., is interesting and characteristic. This vessel was delivered to the Shipping Board on June 30, 1918, and five days thereafter, on July 5, was sent to the Hawaiian Islands to aid in relieving acute shortage on the islands due to the regular vessels being sent to the Atlantic.

The Seattle yards of the Skinner & Eddy Corporation lead all shipyards in deliveries of completed vessels.

The Skinner & Eddy Corporation delivered the first five contract steel vessels to the Shipping Board, among them the "West Lianga," a freighter of 8,543 deadweight tons. This vessel was completed in 78 calendar days, which still stands as the record of a vessel of that tonnage.

This corporation has built and completed in less than a year 22 steeu vessels, 21 cargo and 1 tanker, totaling 194,895 deadweight tons or about one-eleventh of all the new vessels delivered to the Shipping Board.

On October 5 the manager of this corporation announced that henceforth the corporation was prepared to launch and deliver one ship a week.

From the time the present United States Shipping Board took charge of and established shipyards in the United States, that is, in August, 1917, down to October 1, its program of construction has increased the sea-going American Merchant Marine by 408 vessels of 2,376,362 deadweight tons.

Of this tonnage the Pacific Coast contributed 162 vessels of 1,149,685 deadweight tons, or over 39 per cent in the number of vessels, and over 48 per cent in deadweight tonnage.

The shipyards on the Pacific Coast delivered to the United States Shipping Board in September, 37 completed vessels of 209,605 deadweight tons—16 steel vessels, aggregating 134,940 tons, and 21 wood vessels aggregating 74,665 tons—more than 58 per cent of the entire tonnage delivered during

the month from all the shipyards in the United States. The Pacific Coast shipyards are located in three States—Washington, Oregon and California.

The September deliveries to the Shipping Board from American shipyards broke all monthly records in the history of shipbuilding. There were delivered 74 vessels—45 steel of 259,970 deadweight tons, and 29 wood vessels (including three composite vessels) of 102,665 deadweight tons, an aggregate of 362,635 deadweight tons and one steel vessel of 6,695 deadweight tons delivered from Japan, a grand total of 369,330 deadweight tons.

The Pacific Coast deliveries were distributed as follows:

In California the deliveries in September were 10 vessels aggregating 74,140 deadweight tons, as follows:

San Francisco District—6 steel vessels of an aggregate of 52,340 tons.

Grays Harbor District—3 wood vessels aggregating 10,665 deadweight tons.

Thirty-one vessels of an aggregate of 175,665 deadweight tons were launched on the Pacific Coast, a vessel a day and one over, in September. They comprised 13 steel boats of an aggregate tonnage of 112,500 deadweight tons, and 18 wood boats of a tonnage of 63,165 deadweight tons. The vessels were distributed as follows:

In Washington 14 vessels, 6 steel and 8 wood, were launched in September aggregating 80,265 deadweight tons.

Seattle District—5 steel vessels of 44,600 deadweight tons and 2 wood vessels of 7,000 deadweight tons, a total of 51,600 deadweight tons.

Tacoma District—1 steel vessel, 7,500 deadweight tons, and 4 wood vessels, 14,000 tons, total 21,500 deadweight tons.

Grays Harbor—2 wood vessels, 7,165 deadweight tons.



The Motorship "Astri"

Los Angeles District—2 steel vessels, totaling 14,800 tons.

Humboldt Bay District—2 wooden vessels totaling 7,000 tons.

In Oregon the total deliveries in September were 12 vessels aggregating 48,300 deadweight tons, as follows:

Portland District—1 steel vessel of 8,800 deadweight tons, and 8 wood vessels aggregating 29,000 tons, a total of 9 vessels and 37,800 tons.

Coos Bay District—3 wood vessels aggregating 10,500 tons.

In Washington the total deliveries in September were 15 vessels, aggregating 87,165 deadweight tons, as follows:

Seattle District—5 steel vessels of an aggregate of 44,000 deadweight tons, and 2 wood vessels, aggregating 7,000 tons, a total of 51,000 tons.

Tacoma District—2 steel vessels aggregating 15,000 tons, and 3 wood vessels aggregating 10,500 tons, a total of 25,500 tons.

In Oregon 9 vessels were launched in September in the Portland or Columbia River District, 2 steel vessels, 12,600 tons, and 7 wood vessels, 24,500 tons, total 37,100 deadweight tons.

In California 8 vessels were launched in September, 5 steel and 3 wood, aggregating 58,300 deadweight tons, as follows:

San Francisco District—3 steel vessels, 33,000 tons, and 1 wood vessel, 3,500 tons, total 36,500 deadweight tons.

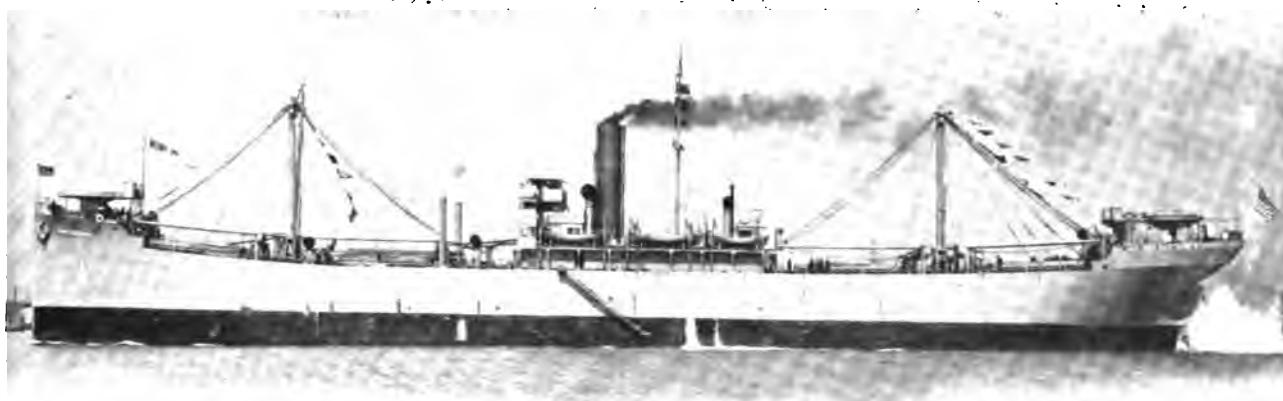
Los Angeles District—2 steel vessels, 14,800 tons, and 1 wood vessel, 3,500 tons, total 18,300 deadweight tons.

Humboldt Bay District—1 wood vessel, 3,500 deadweight tons.

The Pacific Coast is divided into three districts—districts 7, 8, and 11—the United States being divided into eleven districts by the board. On September 1 there were 203 completed shipyards in the United States, 53 being on the Pacific Coast.



S. S. "Ossimeke"



S. S. "Pasadena"



S. S. "Western Queen"

Los Angeles Shipbuilding and Dry Dock Company

THE Los Angeles Shipbuilding & Dry Dock Company was organized in April, 1917, for the purpose of establishing a shipbuilding and repair plant in Los Angeles Harbor. The company was organized with Mr. Fred L. Baker as president and treasurer; Mr. S. L. Naphtaly, vice-president and general manager; Mr. Fred A. Gardner, engineer in chief; Mr. E. M. Leaf, secretary, and Mr. F. P. Ducklee, assistant secretary.

After a thorough survey of a number of locations, the present site was selected on account of its many natural advantages and future possibilities. The site comprises sixty-nine acres on what was formerly known as "Smith's" Island, in the West Basin of Los Angeles Harbor, a marshy swamp entirely under water at high tide. The problem then presented itself of not only building a shipyard and providing the numerous buildings, building ships, wharves and tools, but of first providing the "terra firma" on which to construct these essential features.

On May 14, 1917, the first contract for eight 8800-ton steel freighters was entered into with the United States Shipping Board, Emergency Fleet Corporation. Upon the signing of this contract, orders were immediately placed with the steel mills for the required amount of steel materials for the ships. Orders were also placed for building materials for the building ships, wharves and shop buildings and for the numerous tools required by the various departments.

On May 21, 1917, actual construction work was commenced on the shipyard site. The property was surveyed and locations established for the building slips, wharves and buildings. The first construction work consisted of building a retaining wall along the front of the present building slips, and on June 8, 1917, dredging operations were commenced. The dredging in front of the slips and wharves served a dual purpose. It provided the necessary depth of water for launching ships and a deep water channel from the shipyard to the sea. It also transformed the sixty-nine acres of marsh land into high, level ground suitable to carry foundations for buildings and heavy machine tools.

On June 1, 1917, the first pile was driven for Building Slip No. 1. Slips Nos. 2, 3 and 4 followed immediately, and at the same time work was commenced on Fitting-out Wharf No. 1.

On June 15, 1917, the engineering force removed from San Francisco to the shipyard, and, together with the executive staff, took up quarters in the present general office building, which is the original construction office with considerable additions and extensions.

The first carload of steel materials for ship construction arrived in Los Angeles on July 13, 1917. As the punches, shears and other tools for the plate shop were not yet in operation, the flat keel plates for Hulls Nos. 1, 2 and 3 were cut, punched and formed at the shops of the Baker Iron Works in Los Angeles and then brought to the shipyard.

On July 23, 1917, the keel for Hull No. 1, S. S. "Accomac" was laid in building Slip No. 1 and ship building operations were commenced. Keels for Hulls Nos. 2, 3 and 4 were laid in rapid succession,

the keel for Hull No. 4 being laid August 31, 1917.

Construction work was rushed on buildings for the plate and angle shops and mould loft, and also for the machine shop, blacksmith shop, joiner shop and compressor plant. With the arrival of tools and equipment, these departments were put in operation and commenced to do their share of the work of producing ships.

On October 18, 1917, a second contract was entered into with the United States Shipping Board Emergency Fleet Corporation for the construction of twelve more vessels identical with those already under way. Slips Nos. 5 and 6 and Fitting-out Wharf No. 2 were constructed and additional shop equipment obtained.

It was then decided to build main engines for the new ships and the present erecting shop was built as an extension of the machine shop.

On April 1st, a third contract was entered into with the United States Shipping Board Emergency Fleet Corporation for ten more ships identical, making thirty in all.

On December 15, 1917, Hull No. 1, S. S. "Accomac" was launched and completed on May 30, 1918, and on May 31, 1918, this ship started on her maiden voyage to San Francisco, where she loaded the greater part of a cargo destined for "Our Boys" in France. On her way "over there" the S. S. "Accomac" called at San Pedro and took aboard 500 tons of food and clothing, the gift of the people of Los Angeles to the people of France. Subsequent reports from the officers on S. S. "Accomac" are to the effect that the voyage was most successful and that this first ship is one of which the builders may well be proud.

The keel of Hull No. 5 was laid in Slip No. 1 immediately after the launching of Hull No. 1 and the same procedure has followed on the other slips, the launching of one vessel being followed immediately by the laying of the keel of another.

Today the yard record stands as having built and delivered eight ships, and they are all busily engaged in overseas trade. Fourteen vessels have been launched and keels laid of a total of twenty ships, and materials are now being fabricated for Hulls Nos. 21 and 22.

On July 10, 1918, the United States Shipping Board Emergency Fleet Corporation awarded to the Los Angeles Shipbuilding & Dry Dock Company a contract for ten more ships, making a grand total of forty vessels for the Emergency Fleet Corporation.

Great credit is due the men at the head of the company, first for the organization and realization of a company and plant which materialized so quickly at the call of the Government, and secondly, for the efficiency of the work which has been turned out and that which is now in process.

Great credit is due also to those heads of departments who through co-operation have assisted the management to bring the company to its present system of organization.

Space will not permit a description of each department in detail, and it would be difficult to select a single department which has made more progress than another. The emergency of war conditions, of necessity, created delays, particularly in

the machinery equipment of the ships, and the heroic measures adopted by this company in that respect are deserving of special mention and a short description of the machinery department will be of interest.

The machine shop and erecting shop are located in one building, having a total length of 550 feet, which has a center bay 60 feet wide and two side bays each 42 feet wide in the portion occupied by the machine shop, and one side bay 42 feet wide in the portion utilized by the erecting shop.

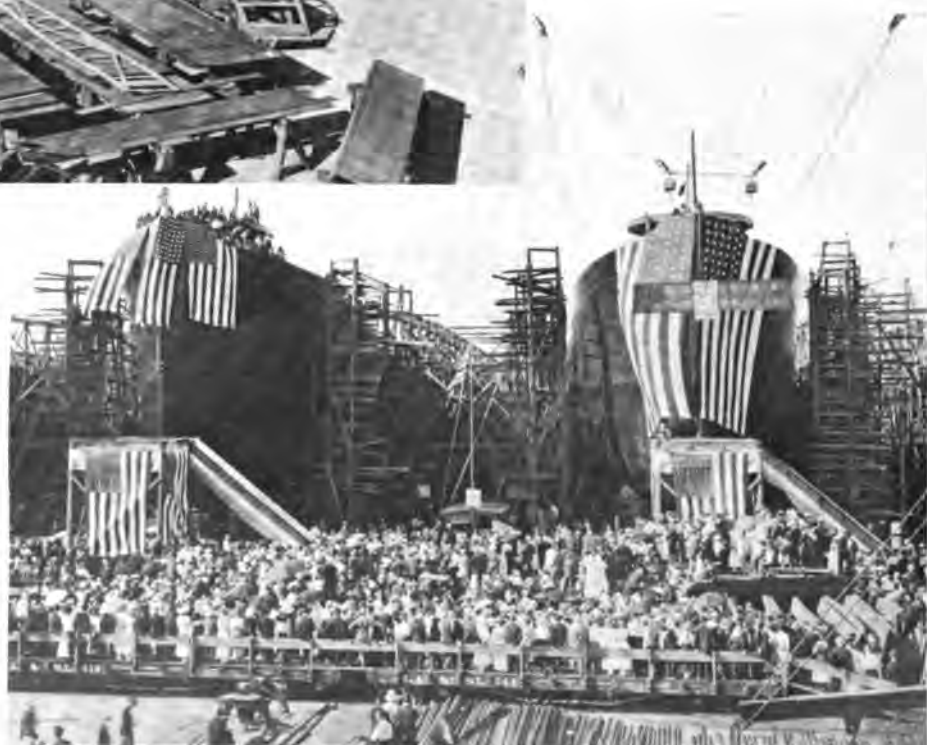
The center bay is equipped with two twenty-five ton



Los Angeles Shipbuilding & Dry Dock Company's shipyard at Los Angeles Harbor. Upper, Fabricating park, showing reinforced concrete derrick columns with double booms. Middle, laying out park and portion of one side of Machine shop. Lower, launching scene, July 4, 1918, showing two of the three ships launched on that day.

overhead traveling cranes, and one fifteen ton overhead traveling crane. The runway for these cranes extends through the machine shop and the erecting shop, which makes it possible to handle heavy castings, etc., directly from the tools in the machine shop to the erection platform in the erecting shop.

The machine shop is equipped with a very complete set of machine tools, comprising lathes, vertical and horizontal boring mills, planers, shapers, slotters, drill presses, grinders and gear cutters,



together with a very complete equipment of special machinery for tool making.

For the construction of the 3500 h. p. marine engines which are being built for the Emergency Fleet Corporation, a large planer was required for handling the bedplates, columns and cylinders. As it was impossible to purchase a suitable tool in sufficient time for this work, a special closed planer was built by the shop itself. This planer has a width of 13 feet between the housings and is equipped with a 22-foot table and a 35-foot bed. This tool is now being supplemented by a 96-inch closed planer having a 22-foot table and 35-foot bed. This tool is also being built by the machine shop. There has also been provided a special radius planer for machining the Stephenson Links, this attachment being placed on a 32-inch open-side Deitrich and Harvey planer.

It was found impossible to provide suitable boring mills for boring the intermediate and low-pressure cylinders of the 3500 horse power engines. These cylinders are respectively 47 inches and 78 inches in diameter. To overcome this difficulty, special vertical boring rigs have been built which are bolted to the flanges of the cylinders and are driven by independent motors. Two rigs have been built for machining the intermediate cylinders and two for the low-pressure cylinders. Both intermediate and low-

In addition to constructing the main engines for the 8800-ton freighters now building, the anchor windlasses, steering engines, steam capstans and condensers are also being constructed in the machine shop, this work being accommodated in the side bays of the main building.

A very large amount of work has also been done in the machine shop during the construction of other departments of the plant. This work has consisted largely in the making of many small tools and the construction of a number of steam

hammers for the blacksmith shop and at the present time work is progressing on a large set of bending rolls for the plate shop.

The machine shop equipment of tools is continually being increased and when the present program of enlargement has been carried out, the shop will be in position to not only construct the main propelling machinery for the vessels, but also all the auxiliaries.

The plant is admirably situated for transportation purposes. The tracks of the Pacific Electric Railway pass the gates to the plant and provide direct service to Los Angeles, San Pedro and intermediate and surrounding towns for passenger service, and spur tracks of the Southern Pacific Railroad enter

the plant, making available direct freight transportation.

With all the contributory advantages of location, plant, efficient organization and almost immediate prospects of a huge Pacific Coast merchant marine, the outlook at the plant of the Los Angeles Shipbuilding & Dry Dock Company could not be better. The future is bright and promising, not only during the completion of its present contracts, but principally in connection with the shipping which will now be indispensable to the future of the country.

The management of the company is as follows: President, Fred L. Baker; vice-president and general manager, S. N. Naphtaly; assistant to general manager, L. E. Caverly; comptroller, F. G. Phillipps; plant engineer, W. D. Jones; superintendent, Thos. J. Allan; assistant superintendent, Geo. H. Greenwood; secretary, E. M. Leaf; assistant secretary, F. D. Dunckles.

These are the men who are largely responsible for the plant's splendid success.



Thomas J. Allan, Superintendent, Los Angeles Shipbuilding & Dry Dock Company



Type of ship being built at the plant of the Los Angeles Shipbuilding & Dry Dock Company

pressure cylinders have two piston valves and a special rig has also been provided for boring the two valve chambers at once. This attachment is bolted to the flange of the cylinders and is motor operated.

Tacoma News Notes

THAT active measures will now be taken by the citizens of Tacoma and Pierce county, following the vote to place this port under a port commission basis is the declaration of local shippers. The port proposition has been before the voters of this city and county at least four times and met defeat. Following the example set and with the result shown by other ports it was decided this time that the proposition must go through and it did by an overwhelming vote.

For some years the marine trade out of Tacoma has not kept pace with other coast ports, though there has been a steady gain. Lack of port facilities has in a large measure been responsible for this. The natural port advantages are here, but this has not been bringing the trade that has come to other ports where a less advantageous location has been improved upon. A number of steamship companies have at different times signified their intentions of making this port a terminal point, but have held back on account of the lack of docks.

In dock here at the plant of the Todd Drydock & Construction Corporation, the steamship Alaska, of the Alaska Steamship Company, shows the effects of her bump into a rock while on a recent voyage south from Alaska. The stem of the ship buckled with her plates bending within like fingers intertwining. The smash carried the plates back dangerously close to her forward bulkhead. If this had gone it is very probable that the Alaska would have gone down in sixty fathoms of water, as the ledge broke off to this depth where the vessel rested. The accident occurred during a heavy fog with the ship proceeding at very slow speed.

The arrival of the steamship "Geo. W. Elder" early this month attracted great attention. It has been many years since this old coaster visited this

port. The vessel brought nitrates to Du Pont from the West Coast. The old ship looked as clean as a yacht.

October showed a number of launchings from local yards both in wood and steel construction, while several of the local products sailed away. Since October 16 there have been six vessels placed in the water, while November will show a larger list than this. Among the vessels launched were the Egalite, Foundation yards, October 7; the Fort Riley, from the Seaborn yards, October 10; the Vailly, Foundation yards, October 16; Yukon, from the Todd Drydock & Construction Corporation plant, October 26; Justice, from the Foundation yards, October 30.

Considerable interest is aroused here among business men and shipbuilders over the future of the Foundation yard. So far as known, no new work has been awarded this yard. Contracts are said to be ready if the Emergency Shipping Board heads are willing to give permission to start a new construction program. At present the company have only two vessels left to launch on their contract of twenty awarded them by the French government.

Sponsored by Miss Llewellyn Morrison, sister of President Phillips Morrison, of the Seaborn Shipbuilding Company, the Ferris type ship Fort Russell was successfully launched at this yard on the evening of November 6. This makes the tenth vessel put out at these yards for the government since the war started.

It was of considerable interest to Tacoma shipping men when the official announcement was made here by President H. F. Alexander of the Pacific Steamship Company that his interests, or the Pacific Alaska Navigation Company, and the Pacific Steamship Company, had purchased the ships of



Fitting-out Slip No. 1 at the Los Angeles Shipbuilding & Dry Dock Co., showing two vessels getting ready for delivery to the Emergency Fleet Corporation in November and December, 1918. Note the two six-ton fitting-out derricks

the Pacific Coast Steamship Company and placed under the Admiral flag a list of twenty-two ships. In connection with this, the vessels will carry Tacoma as their home port. The Admiral line is now operating with chartered vessels awarded them by the Shipping Board a fleet of some forty-six vessels. Eight of these will be engaged in the Oriental service.

Word received by the Osaka Shosen Kaisha, November 6, from their outbound steamship Borneo Maru, reported this vessel stopped on account of an accident to her steering gear. It was said that as soon as repairs could be made, the vessel would return to this port. The ship was then about 800 miles out.

One of the largest libel suits filed in the federal court here in a number of years was brought by the Booth Fisheries Company of Delaware, the Northwestern Fisheries Company, and Peter M. Nelson, owner of salt herring on board the bark A. J. Fuller. This suit was the result of the sinking of the Fuller by the Mexico Maru of the O. S. K. line in the harbor at Seattle, October 30. It is alleged that the Fuller was owned by the above companies and worth \$250,000, with salmon cargo valued at \$421,636.20; labels at \$1960 and oil at \$5600. The complaint states that the Mexico Maru was navigated at a high speed in anchorage grounds and did not have sufficient watchmen. It is claimed that the watchman of the Fuller saw the lights of the steamer several minutes before the vessels collided. Bond was later furnished by the steamship company, amounting to \$850,000.

Tea inspection at the port of Tacoma, the examining port for this district, totaled 10,615,098 pounds, according to United States Tea Examiner L. G. Fenton. This is the largest amount of tea examined at any port in the United States for one month. This business was greater for October than for the entire year of 1912.

Suit has been filed here in the federal court by the Fanestrad Navigation Company of New York against Andrew Peterson and the Aberdeen Shipbuilding Company. It is alleged that Harold Sæther entered into a contract with Peterson to build a schooner for \$260,000 and did not agree with the Aberdeen Shipbuilding Company, who apparently did the constructing. The vessel was defective in gear and machinery to the extent of \$10,000, for which judgment is asked.

According to word received by local shipping men, Capt. W. Frank Andrews, of the Washington Stevedoring Company, but now a lieutenant commander in the navy, is on his way or in French waters with his ship.

Capt. Jack Walters, who took the steamship West Llianga across, is home again. Capt. Walters has been assigned another ship and will do some cruising in the Pacific, probably between San Francisco and the Hawaiian Islands.

On the last voyage of the Garland line steamer Justin out of here, Capt. W. F. Eckert was accompanied by Mrs. Eckert. The voyage to an extent is in the nature of a honeymoon. Capt. and Mrs. Eckert were married last May. The Justin went to Shanghai this voyage.

Following the lead of other shipyards throughout the country, the boys at the Todd Drydock & Construction Corporation plant are publishing a little monthly called "Down the Ways." Claire Bowman is one of the very interested ones in the

new publication. All the boys of the yard are contributors.

The old freight steamer Transit, formerly powered with a heavy oil engine, has been rebuilt for ferry service, and is now ready to begin operations as soon the county completes a ferry slip. The ferry is owned by the Merchants Transportation Company of Tacoma, which has a contract with the county for the boat.

The largest quantity of salmon handled here for a number of years is being put through the dock and stored in the warehouses of the Quartermaster's Department. Six cargoes at least have been discharged, among them those of the sailing vessels Oriental and George Curtis.

WANTED—ENGINEERS FOR U. S. NAVY

The Navy Mobilization Office, 742 Market street, San Francisco, today received telegraphic instructions from the Navy Department, Washington, D. C., to continue its effort to secure deck and engineer officer material for induction into naval service. Engineer officer material will be assigned to the U. S. Navy Steam Engineering School, located at Stevens Institute of Technology, Hoboken, N. J.

With the signing of the armistice last week the emergency which made necessary the original call for engineers and deck officers did not cease to exist, but, on the contrary, was greatly increased. The country is now faced with the colossal task of returning its "Victory Boys" as speedily as possible consistent with safety and personal comfort. This is the task which the Navy is now called upon to accomplish, and it can best be done with the co-operation of every man qualified for a commission in these branches of naval service.

The U. S. Navy Steam Engineering School is open to men between the ages of 20 and 40, who meet the physical requirements of the navy for line officers, who are of thorough ability and officer-like character, and who have completed an engineering course (mechanical, electrical, civil, mining or chemical), at certain recognized technical schools or who possess an education and experience along steam engineering lines adjudged an equivalent thereof.

The course consists of five months of training divided as follows: One month of training at the Naval Training Camp, Pelham Bay Park, New York; one month of technical work at the U. S. Navy Steam Engineering School; two months of practical training on board ships and in shops in the vicinity of New York; one month finishing the course of instruction at the U. S. Navy Steam Engineering School.

A graduate of this school will be commissioned an ensign in the Naval Reserve Force (pay \$1700 per annum, plus allowance for sea duty and dependents). The duty to which a graduate of this school will be assigned will be that of engineer officer in the auxiliary branch of the Navy for service on cargo-carrying vessels and troop transports.

Properly qualified applicants will be individually inducted into the Naval Reserve Force, and on being assigned to the school will be rated chief machinist mate, and will draw the pay of that rating (\$83 a month, plus allowance for subsistence, dependents and uniform) during the course of instruction. Application may be made to Navy Mobilization Station, 742 Market Street, San Francisco.



James Strachan Milne, Chief Engineer, Todd Shipyards Corporation

Born in Scotland, serving his apprenticeship there in marine construction, he came to America in 1889, and for seven years was attached to the International Navigation Company (the American Line). In 1896 he was engaged by the Newport News Shipbuilding & Dry Dock Company as guarantee engineer, bringing out the "La Grande Duchesse," the first large passenger vessel equipped with Babcock & Wilcox water tube boilers. This vessel had a very checkered career, and in sailing under the name of the "Carolina" was recently sunk by a submarine. In 1899 he accepted the position of superintendent with the Neafe & Levy Ship & Engine Building Company at Philadelphia, and took charge of the building of the first U. S. destroyers, "Bainbridge," "Barry" and "Chauncey," and also the cruisers "Denver" and "St. Louis." Early in 1907 he transferred his field of supervision to the Pacific Coast, being engaged by the Union Iron Works of San Francisco as superintendent, holding this position for almost ten years, when he became attached to the Todd Shipyards Corporation at the beginning of 1917 as chief engineer. A keen observer and ardent advocate of close application to work, he is nevertheless a strong supporter of "fair play" to all. A man of very few words, yet regarded in the most genial spirit by the workmen.

Structural Steel Standardized Cargo Vessels

THE war has brought about a new type of ship construction, commonly referred to as "fabricated ships," which only in part describes the new method that we have had to solve in manufacturing structural steel cargo vessels at the Newark Bay shipyard.

Our problem was one of quantity production, thereby necessitating thorough standardization of design, ship material, fabrication and assembly.

By referring to the newspapers during the months of March and April, 1917, before and after we entered the war, one will note with interest how much discussion there was over the problem of new ship construction made absolutely imperative by our entrance into the great world war. Some suggested large numbers of small wooden ships of 1,600 tons burden, with high speed. Others demanded larger ships, and many agreed that wood was the only material available to construct the emergency fleet.

In the fall of 1916 the Submarine Boat Corporation had completed for the British Admiralty 550 submarine chasers which were built of wood, the hull material having been fabricated in its Bayonne, New Jersey, shops and assembled into the finished boats at Montreal and Quebec, Canada. This was the first large boat manufacturing project ever attempted and was successfully completed ahead of contract time; it was the "model experiment" for the far greater task we are now engaged in of furnishing to the United States Shipping Board Emergency Fleet Corporation one hundred and fifty 5,000-ton steel cargo ships.

Our experience in obtaining the proper quality of material for wooden boat construction, an art that had practically disappeared, made us feel certain that the large tonnage desired in wooden ships would be most difficult to obtain, not only on account of material, but also because of the shortage in wooden shipbuilding labor. Further, while wood could be fabricated into boat material, nevertheless the material would not stay put like steel, due to shrinkage, checking and rot.

Upon investigation we learned that the output of ship steel for months to come had already been allotted to the established shipyards for merchant work then under way and for naval requirements. We therefore recommended to the United States Shipping Board Emergency Fleet Corporation in April, 1917, that in place of wood we be permitted to submit a plan for manufacturing steel ships to be built with the ordinary commercial structural

The word "Fabrication" in connection with the shipbuilding industry during the war has held a certain weird fascination for the lay mind. Its use in the public press has conjured up visions of wonderful processes whereby pieces of ships, half ships, whole ships, were assembled at points far from tide water and were to be seen dancing across the prairies, hopping over the hills, and plunging into the Atlantic to the confusion of the U-boats and the delight of starving multitudes across the sea. Henry R. Sutphen, in his article, which was read before the Twenty-sixth General Meeting of the Society of Naval Architects and Marine Engineers held at Philadelphia, November 14 and 15, 1918, tells in very clear fashion the true story of the great plan to manufacture cargo vessels from structural steel on the "Fabrication at a Distance" method.—Editor.

steel as had been employed in building our skyscrapers, bridges and tanks from which America had obtained such a reputation in steel construction; and, on account of the great emergency and the demand for a large number of ships, we further suggested that we be permitted to manufacture ships and not build them one at a time.

Our plan called for utilizing the large number of bridge and structural steel shops throughout the country which were not then busy with commercial work and which could be employed in fabricating steel shapes and plates from accurate drawings and patterns which we would supply. On account of using unclassified steel, we suggested that we compete in size of ship with the then proposed wooden vessel of 3,500 tons deadweight capacity, but as we progressed in the details of design and construction it was found possible to increase the deadweight ca-

capacity and still retain standardization in design and material to 5,000 tons, which is the size of the ship we are now producing in quantity. This size was fixed for other reasons. An analysis of pre-war merchant shipping disclosed the fact that the average commercial cargo carrier ranged between 4,000 and 5,000 tons with a full load speed of 9 knots. It was therefore believed that a 5,000-ton craft, able to make $10\frac{1}{2}$ knots per hour, would be preferable and probably prove a desirable type for service in the years to come. Further, and of no less importance, careful investigation showed that the unit features of a 5,000-ton ship, fabricated at more or less distant outlying plants, would utilize freight car capacities to their fullest and most economical extent and still carry out the plan of having as many rivets as possible driven at the fabricating shops. A total of 427,000 rivets is required to be driven for one of these hulls, and of this total over 100,000 are driven at the fabricating plants, where the work is done on a much more economical basis than in the shipyard. For illustration, the smokestacks were so designed that their maximum diameter came within the width of an ordinary gondola car, permitting the stacks to be shipped completely assembled. The floors with intercostals were assembled in groups of three, the ordinary 36-foot flat or gondola car carrying six sets of floors which, when loaded, kept within the railway clearance. It was recognized at the start that the railroads would be heavily burdened and, as a very wide region would have to be drawn upon

to furnish material, it was absolutely essential that the car space should be made the most of, so that the fewest possible carriers would be needed to maintain a steady flow of supplies to the assembly yard on Newark Bay.

Our problem was first to use commercial structural shapes and plates that could be had in large quantities, and design the ships so that these could be assembled with a minimum of alteration through bending, and next that the plans should be so developed that the bridge builder and the structural shops should have no difficulty in reading the drawings and adapting their experience and equipment to the fabrication of the parts for ship construction. The naval architect had to speak and draw in terms familiar to the great army of structural steel workers, requiring some radical modifications in the matter of classification details, and imposing rather pronounced departures from the ordinary shipshaped models, in order that the materials at hand might be incorporated in the most efficient manner for maximum production and accuracy of fit. In brief, this necessitated the elimination of curves and the substitution of straight lines and angles wherever possible.

The decks are without camber and generally without sheer, the sides throughout the length of the parallel body are perpendicular; the bottom is flat, and is merged with the sides by a short and abrupt curved bilge. By eliminating the dead-rice characteristics of the vessel it was possible to adopt a uniform size of floor throughout the parallel body and to have recourse to longitudinals which would all be of the same height. Forward and aft of the parallel body the model subscribes with reasonable closeness to that of the accepted design of ocean-going carriers.

From the tests made at the Government Model Experiment Basin it was disclosed that the ships are rather economical in their propulsive requirements, with a block co-efficient of 0.76. Their drive is as easy as the ordinary model of cargo carrier of like displacement and similar speed. The effect of the usual sheer is obtained by giving the upper deck, forward, a flat rise of 5 feet to the stem. This, with the usual flaring bow, gives the desired measure of added buoyancy when driving into a head sea. The parallel middle body constitutes about 43 per cent of the ship's total length.

The principal dimensions and general characteristics are as follows:

- Length between perpendiculars, 324 feet.
- Length over all, about 335 feet 6 inches.
- Beam, molded, 46 feet.
- Depth at side to upper deck, 28 feet 6 inches.
- Load draft, about 22 feet 11 inches.
- Number of propellers, 1.
- Propelling engine, turbine of 1500 horsepower.
- Speed, 10½ knots an hour.
- Deadweight capacity, 5000 tons.

The ships are constructed upon the transverse system of framing, and the double bottom extends from the after peak bulkhead forward to the collision bulkhead. There is but one complete deck, the upper deck, extending from bow to stern. Without exception, the decks are worked flat, both athwart-ships and fore and aft.

As quantity production was the keynote in build-

ing these ships, it was essential that the main propelling machinery should be of types capable of being manufactured in quantity. Therefore watertube boilers were chosen with reduction gear turbines. The boilers are of the Babcock & Wilcox make with a total heating surface of 5800 square feet, operated with coal or fuel oil under natural draft. The propelling machinery consists of a geared Westinghouse turbine capable of developing 1500 shaft horsepower, turning a 15½-foot, 4-bladed screw at 90 revolutions per minute. The turbine is connected to the propeller shaft by a helical, double reduction gear with a ratio of speed reduction of 40 to 1. The steam consumption of the turbine when operating at full power should not exceed 12.5 pounds per shaft horsepower.

The storage capacity for fuel oil is 660 tons, carried in the double bottom, which will be sufficient to operate the vessel 7000 miles.

The ships are fully equipped with all necessary auxiliaries and deck machinery with comfortable quarters for a crew of 60 men, including 22 men for military operations. Like all other ships building for the Emergency Fleet Corporation, the equipment is complete in every detail.

Referring to the fabrication and assembly of these ships, which undoubtedly is of the greatest interest to our members, the total weight of structural steel required for one of these ships is 1564 tons, 462 tons being in shapes and 1102 tons in plates. The only ship sections used in the design were a few bulb angles at both ends, amounting to 1½ per cent of the total weight, or 23 tons. Under our contract all drawings were to be approved by both the American Bureau of Shipping and Lloyd's Register. This meant that, wherever in any particular the rules of the two societies differed, we had to adopt the more stringent rule, and this resulted in a heavier ship than would have obtained by classification in one society. Notwithstanding the increase in weight between these ships and those built with ship classification steel it has been demonstrated that commercial structural shapes were used advantageously and did greatly relieve the steel mills from furnishing classification ship material.

Ninety-six per cent of the total weight of the hull was fabricated at outlying establishments. Twenty-eight steel mills supplied material to 56 fabricating plants, not to mention the contributive labors of 200 foundries, machine, pipe, joiner and equipment shops which figure more or less in the building of a cargo carrier. The fabricating shops are scattered from Wisconsin to Massachusetts and as far south as Virginia, and inasmuch as the parts are fabricated in such a large number of different shops and as the individual parts must be interchangeable, one of the first considerations was to make necessary provision for giving the information to the fabricating shops in such a manner as to insure accuracy of work and speed of production.

It was the bridge engineer working in conjunction with the naval architect who properly interpreted the details of ship fabrication into the language of the bridge shops, thereby permitting the structural shops to fabricate the complicated ship material with the tools and facilities they had in hand, an operation that many old line shipbuild-

ers questioned could be carried out successfully. So far as the straight parts of the parallel middle body, flat tank tops and flat decks were concerned, it was an easy matter. It was simply a case of making detail drawings exactly as they would be made for a railroad bridge giving definite location by dimension of every hole, rivet and each piece of steel. In all some 330 drawings were made of details of hull fabrication. From these drawings all the steel was ordered from the mills exactly to the length required. In the molded portion of the ship, however, the problem became more complicated to the bridge engineer, as this section of the hull could not be mathematically developed. Such plates and shapes were developed full size on the mold-loft floor, reproduced on template paper, having all rivet holes punched in them on proper gauge lines and for a matter of record carefully measured up and detailed to dimension on individual drawings. Even with complete drawings it was difficult for the fabricating shops to reproduce the plates on account of the edges and gauge lines being curved. These lines could only be located by dimensioning a series of points on the curves.

As we could not count upon two men springing a batten and getting the same shape between points, we overcame this phase of the problem by sending templates of the shell plates in the molded sections to the fabricating companies. These templates, made on template paper approximately 1-32 inch thick, were direct copies of the original template developed on the mold-loft floor. A difficulty was experienced in the shrinkage and expansion of these templates, and, to insure the change of shape of the templates causing no misfits, each template was marked before being sent out with certain dimensions. To begin with, the paper used is fairly heavy fabroid material, which has a rather low coefficient of expansion. It was then marked and cut in accordance with the development on the scribe board, and rivet holes, etc., were laid out upon the paper, spaced and dimensioned with great accuracy.

The correct dimension for the length of the template, also the correct dimension for width at each end, was painted on with arrows indicating exactly where these dimensions were taken. In addition to this, a straight line was scratched the full length of the template approximately at the center line. The shop receiving this template was requested, in all cases before using it, to measure it and make certain that the template, as they used it, was correct to the check dimensions given. They were also requested to test the straight line scratched on the template with a straight edge. When, as was very frequently the case, they found that the dimensions did not check or that the line was not straight, they were required to bring it to shape either by dampening it or drying it, as the case might be. There still remained, of course, the possibility that when a template had been expanded by dampening and stretching, the expansion might have taken place all at one section of the plate rather than throughout its length. As it was possible for this to happen, neither checking the dimensions on the template nor checking the straight line would detect the error. To overcome this we insisted that the fabricators check

their templates against the detailed drawings which were furnished them. In as much as the local steel tapes determined the measure of this variation, it was of prime importance that every tape at each and all of the outside works should be uniform.

A single tape was selected for the Newark Bay shipyard where the original templates and drawings were laid down on the mold-loft floor, and with this master tape every other tape to be used was compared and carefully calibrated, and a coefficient, plus or minus, prescribed in each case. In this way it has been entirely practicable to insure dimensional agreement not only within the different departments of the Newark Bay shipyard, but similarly within the different departments of every outlying contributive establishment.

This seemed a large amount of checking, but it must be remembered that in each case this had to be done only once, as the majority of the shops, after getting their template exactly as required, used it to lay out one steel plate or section which was used as a template for all duplicate operations. A tolerance of 1-16 inch was allowed on all punching, this being the amount of reaming that is done when the material is being erected.

Not only is the hull material all fabricated outside, but also the material for machinery installation, such as piping, valves and innumerable fittings. The piping comes bent, with flanges attached, to exact shape, requiring only assembly in the ships. All joiner work and wood sheathing is fabricated in a shop at Detroit, Michigan, and shipped to the yard in complete ship sets, and as it is received completely finished, painted, varnished and with hardware attached, it is merely a matter of assembly when the ship is ready to receive it.

Before the work started, the idea of fabricating ships on such a large scale was further questioned, on the ground that the structural steel workers could not drive a tight rivet, and that his work would not be satisfactory nor pass inspection. Quite the contrary has been the result, as the work has been entirely satisfactory, equal in every respect to work done in the established shipyards, although the question of labor has always been a most difficult problem and could only be obtained by a system of training which has been very thoroughly developed. Over a thousand skilled workmen a month are being turned out by our training department.

Our success is in no small part due to the layout of the shipyard. There are 28 building ways, occupying a waterfront space of substantially one-half mile. Electrically operated derricks, each having a maximum lifting capacity of three tons, are placed between alternate ways and arranged with a reach which will enable them to deal with the materials for a pair of ships. Eighteen miles of railway track insure a steady flow of steel and other material by the shortest possible routes to the points of incorporation in the ships when on the ways or at the fitting-out dock, the latter having a length of nearly one mile, where 22 vessels can be berthed at one time, served by a 400-ton gantry crane with a lifting capacity of 50 tons. By an overhead structure, electric and steam cranes serve for minor lifts and place on board the ships

directly from adjacent storehouses the equipment and material with the least amount of handling.

Between each companion pair of building slips and beneath the tower derricks is located an administrative building for the superintendent and foreman in charge of the two ships. Within this structure is kept a complete set of plans and all other necessary data. With the exception of the rivet forges, which have their blowers operated electrically, all of the other power tools are driven by compressed air supplied from seven direct-connected electrically operated compressor plants.

The fabricating plant at the shipyard is divided into two sections, the north and south shops, where bending floors are located, also punch shops, rolls and forges. The bending floors are fed from eight furnaces, all the curved sections fore and aft being bent on these floors. The shops fabricate four per cent of the total weight of the hull. The plates to be rolled are shipped flat from the fabricators, punched and shaped to size, and rolled at the shipyard. As many as 175 tons of plates have been rolled in a single day. Furnace plates, of which there are only eighteen, requiring hot forgings, are pressed hot in hydraulic presses at the outside fabricating shops and shipped to the yard in blank form, where they are punched and worked to size to correct metal templates.

Exclusive of the rolled plates, these shops with their limited equipment have delivered 460 tons of

frame material per week, working night and day shifts, which, we believe, will compare most favorably with other shipyards.

Rivet driving being the barometer of production has gradually increased from 30,000 per day during July to about 75,000 a day for October, with an average drive of 32 rivets per gang hour. As the men become more experienced and accustomed to their task, we believe that a higher average hourly rate will be obtained.

For the last two months we have employed an average of about 12,000 men and have been assembling at the rate of six ships per month; 18,000 men will ultimately be required to fully man the yard, when a production of twelve ships per month may be expected.

We are a little over a year old in our enterprise, having broken ground on September 14, 1917, and during this period, through an unusually severe winter, we have completed the shipyard, delivered our first ship, the Agawam, classed A1 by both the American Bureau of Shipping and Lloyds; this being the first fabricated ship built of structural steel to be delivered, and launched in all fifteen ships, which conclusively proves the soundness of the fabricated construction and how this method which we have employed has been the only one that could have been followed in the emergency to build the bridge of ships to Pershing and victory.

Recent Extensions of the Pacific S. S. Company

IF the Pacific Steamship Company should adopt a slogan embodying the spirit that animates the organization, this slogan would be, "Westward the star of commerce takes its way."

Indicative of its belief in this slogan, announce-

join the company's force of agents who have been sent to Asiatic ports during the past year.

It was also announced by A. F. Haines, general manager, that subject to the Shipping Board's approval the company would place five more vessels in the Oriental service. Three vessels are now in this service and the addition will nearly triple the tonnage engaged in trans-Pacific trade under the Admiral Line flag. No official announcement has been made as to the names of the vessels, but it is understood that four will be chartered freight carriers, while the fifth will be one of the company's passenger and freight steamships.

E. E. Johnson, foreign freight agent at Seattle, and E. L. Matteson, formerly private secretary to the general manager, are scheduled to leave on December 14th for Vladivostok, where the Pacific Steamship Company will establish its own agency to connect up with the chain of agencies already opened in Asia.

Johnson has had years of experience in the Oriental trade. For a number of years he was with the Wilson Line and other British steamship companies in the Far East.

Among the prominent officials of the company now in the Orient are R. D. Pinneo, foreign department manager, and John J. Gorman, general Oriental agent, whose headquarters are in Hong Kong. H. K. Laidlaw, who has been representing the Admiral Line in Japan during the last eight months, will return to Seattle about the first of the year. The name of his successor has not as yet been announced.

During the past year the Pacific Steamship



R. D. Pinneo, Manager Pacific Steamship Company's Foreign Freight Department

ment was made a few days ago to the effect that additional representatives of the company would leave for the Orient during the present month to



Ernest E. Johnson, Foreign Freight Agent at Seattle for Pacific Steamship Company

Company has also extended its organization in the United States. Last summer a New York office was opened, which is now in charge of Hugh Gallagher, general Eastern agent. Recently the com-

pany opened an office in Portland, Oregon, with Frank J. O'Connor as agent.

At the present time the Pacific Steamship Company owns and is operating twenty-five passenger and freight steamships on the Pacific. In addition it is operating a dozen or more vessels for the Shipping Board.

Its coastwise routes extend from Nome, Alaska, to San Diego, California. Its off-shore activities in its own behalf and for the Shipping Board radiate from Puget Sound and the Columbia River to the Orient, South America and the Atlantic.



Interior Pacific Steamship Company's new ticket office, Seattle

A 400 Ton Concrete Barge

TO demonstrate the practicability of reinforced concrete for barge construction the Concrete Boat Company of San Francisco, with offices in the Monadnock building have completed a bay barge, which was launched from their yard at Fruitvale, Cal., on October 19.

This vessel, a 400-ton barge, 100 feet long, 32 feet wide and 9 feet 6 inches deep, was designed by Messrs. D. W. & R. Z. Dickie of San Francisco, consulting naval architects for the builders. J. H. Brunnier, now assistant chief engineer of the Concrete Ship Department of the Emergency Fleet Corporation furnished the structural design and P. J. Herold of the Concrete Boat Company was supervising engineer.

Briefly the construction of this barge is as follows:

Main transom frames 5"x13" are spaced at 8' centers with sub members midway between; these with longitudinal beams 4"x12" spaced on 4' centers, divide the deck bottom and sides into 4' square panels. The deck and sides are 2 1/2" in thickness and the bottom, excepting at the runs which are 3" in thickness is the same. One longitudinal bulkhead 3" in thickness and four trans-

verse bulkheads 1 1/2" in thickness divide the hold into 10 water-tight compartments.

The reinforcement for the deck, bottom and side slabs consist of two courses of galvanized Clinton Mesh, while that for the beams and frames are straight deformed square bars. Bars in transverse frames and longitudinal beams are oxy-acetylene welded.

All concrete, excepting that in the bulkheads was carefully placed by hand, extreme precaution having been taken to not displace the reinforcing. Concrete used consists of one part special "oil well" cement ground to a fineness so that 91 per cent passed through a No. 200 sieve, one part No. 2 Lapis sand and two parts one-half inch washed river gravel. This proportion was used after various tests of materials were made and plotted by R. E. Noble & Company of San Francisco and the resulting concrete obtained justified these tests, as its ultimate compressive stress in all cases exceeded 5000 lbs. per square inch after thirty days. All concrete was mixed at least three minutes with only sufficient water to make the mixture workable in the forms. The bulkheads were hand plastered on metal lath placed over the re-



inforcing, the mixture being one part cement to one and one-half parts sand.

Cement was furnished by the Santa Cruz Portland Cement Company, sand by the Bay Development Company and gravel by the Grant Gravel Company.

Following the general specification of the U. S. Shipping Board all exterior surfaces were treated with three coats of magnesium fluosilicate supplied by the L. Sonneborn & Sons, Inc., of New York, which was followed on the sides and bottom by two

of ships has so far been somewhat hindered by making a shell of unusual thickness, with consequent excessive weight, and the construction of this barge has proven to the builders that by the careful designing and spacing of reinforcements a very thin shell could be produced, possibly under two inches.

It is the intention of the builders to turn the barge over to one of the local tow-boat companies for use on San Francisco Bay, where its performance will be watched with great interest, as it will demonstrate the relative durability and cost of upkeep and repairs of concrete and wood barges.



Four hundred ton concrete bay barge in process of construction. Upper left shows reinforcement in place for framing. Upper right, reinforcements for deck panels. Lower left, placing concrete by hand on deck. Lower right, finished barge sliding into bay.

coats of anti-fouling paint.

The main point of interest in the construction of this barge lays in the fact that it is the first concrete vessel constructed with a $2\frac{1}{2}$ -inch formed skin. Extreme accuracy had to be exercised in the construction of the forms, the spacing of reinforcements and the placing of concrete, but the excellent results obtained demonstrate that a skin of this thickness will materially increase the efficiency of vessels of this type without detracting from their strength, rigidity or durability.

The use of concrete in the construction





(By Special Correspondent)

COINCIDENT with the sudden closing of the European war came the announcement of the officials of the U. S. Shipping Board to the effect that the monster shipbuilding program was to be continued, and that all of the vessels planned would be built. This announcement carried with it the stipulation that only the shipyards that have shown a high state of efficiency in ship production would be favored by the Shipping Board in the building of the remaining ships provided for in the schedule.

In making this announcement both Chairman Hurley and Charles M. Schwab declared that the pace set by the Pacific Coast shipyards insured their being favored with the building program of the Shipping Board. This announcement is bolstered in the case of the Seattle shipyards by the fact that steel is being received at the local yards in larger quantities than at any time in the history of the emergency building program.

The local builders, however, are not free of troubles. No sooner had Adjutant General Crowder declared the "work or fight" law non-effective temporarily, than thousands of workmen immediately deserted the shipyards. In the big Skinner & Eddy plant, General Manager David Rodgers recently estimated that fully 2500 men had thrown up their jobs. In spite of this handicap, however the champion shipbuilders of the Northwest are keeping up the pace.

Today Skinner & Eddy have launched thirty-nine vessels, thirty-three being for the United States Shipping Board. Of this number, which includes eight commandeered hulls, thirty vessels are in the service of the Emergency Fleet.

Since the last report in this publication, Skinner & Eddy have launched four ships: Ames Shipbuilding & Drydock Company, two; J. F. Duthie & Company and the Seattle North Pacific, one each. This represents a total of eight large steel freighters built for the Shipping Board at local plants. Skinner & Eddy plant likewise delivered three ships, one of which was their new record craft, the "West Mahomet," built to launching in forty-six and one-half days, and to commission in a total of sixty-four working days.

One of the notable events of the November building program was the celebration of the anniversary of the first launching at Ames' plant, when that shipyard sent the "Western Knight," the twelfth product of the yard, down the ways on November 25. The anniversary really was November 24, but that day being Sunday the big shipyard commemorated the event by holding the ceremonies Monday. Mrs. E. L. Grondahl, wife of the vice-president of the company, officiated as sponsor. The vessel, like all the Ames ships now building, is constructed on more refined lines than the former 8800-ton type of ship—a design developed

at this shipyard, and calculated to insure at least one knot more speed to the vessels when in service.

On the last day of November, the J. F. Duthie Company slipped their first direct contract ship for the United States Shipping Board. This concern has already delivered twelve ships from a four-way plant to the Emergency Fleet Corporation.

The ship-a-month program announced by Superintendent of Hull Construction Thomas Neilson, of the Seattle North Pacific plant, was maintained the latter part of the month by the launching of the third 9400-ton vessel at that plant. Seattle's wood shipyards likewise maintained an efficient record of production, each of the concerns building for the United States Shipping Board having placed one ship in the water during the past thirty days.

The month was also notable for the launching on November 15 of the first product of the Price Shipbuilding Company plant—the American motor schooner "Snetind". This shipyard was originally started by H. Sandstrom and associates, but experienced financial difficulties early in its career. It was only brought out of its troubles by the advent of J. H. Price, who purchased the shipyard, and is carrying out its obligations. Price, who is one of the youngest as well as best known builders in the wood ship game on the Pacific Coast, was the head of the Cameron-Genoa Mills Company, of Victoria, a concern since sold to the Foundation Company of that place.

Another local shipyard broke into the active production class for the United States Shipping Board when the Puget Sound Bridge & Dredging Company launched the 4200-ton steamship "Blakely." This vessel is known as the Ward type of ship, and is of the same design as the world's record ship, the "Aberdeen." This plant expects to launch the second Ward ship and the first of three of the 5000-ton Geary type before January 1. Under the direction of President Samuel H. Hedges and Construction Superintendent G. L. Lindemann, this concern is engaged in the building of about twenty residences only a short distance from the shipyard, the construction of which is calculated to relieve the housing problem of the employes to a marked degree.

One of the surprises sprung on Seattle during the past month was the Shipping Board's announcement that the steamship "Seattle", first direct contract ship delivered to the Emergency Fleet Corporation by any shipyard in the country, and a Skinner & Eddy product, had her name changed to tated when she was turned over to the navy department as an auxiliary craft, owing to the fact that there is already a line-of-battle craft named in honor of Seattle.

November also witnessed the delivery to the

(Continued on page 130)

A New Record Breaker in Seattle

THE Seattle North Pacific Shipbuilding Company is hitting the ball hard. Since the advent of the Twohy interests into the active management of the company's affairs, northwest production records on steel ships have been sent glimmering.

The first ship, "Ozette," was sent into the water



John D. Twohy, General Manager, Seattle North Pacific Shipbuilding Company

eighty-four days after the laying of the keel. Notwithstanding labor shortage, influenza epidemic and the loss of many good workers through the draft, the second vessel was launched in just a slightly longer period. When John D. Twohy took the reins of general managership a short time ago

he brought with him men from the Twohy organization whose efficiency and ability had earned them enviable reputations. These added to the constructive forces in the old organization brought astonishing results in production.

Twohy Brothers are known through their constructive genius in large undertakings. Among their achievements is the building of the great aviation camp at Riverside, California, which broke all previous government construction records, having been completed in but sixty days. At this time the personnel of the firm consisted of Judge John Twohy, president; John D. and Robert Twohy, vice-presidents, and James F. Twohy, secretary-treasurer.

Having completed the March Aviation Field, the firm turned its attention to steel ship construction and purchased controlling interest in the Erickson Engineering Company of Seattle, which held a contract for ten 9400-ton shelter-deck steel vessels for the Emergency Fleet Corporation. James W. Black of St. Louis joined in the enterprise. The name of the concern was changed to Seattle North Pacific Shipbuilding Company, and although the plant is called the baby yard of Seattle it has demonstrated its right to a place among the grown-ups.

Miss Grace East, the pretty, petite miss who sponsored the "Yaklok," as the second vessel was called, was selected from the feminine employees of the company. She was one of the first to enter its employ. Although only employees were present, other invitations having been cancelled voluntarily to assist in checking the influenza epidemic, it was a most enthusiastic launching, and the dainty maid was cheered to the echo by the leather-lunged, sweat-stained toilers of the yard.

Splendid progress is being made in carrying out the "Western Hero." The change was necessary the building program. Five other keels have been



Launching of S. S. "Yaklok," Seattle North Pacific Shipbuilding Company, October 21, 1918

laid and it is expected that another ship will be sent down the ways shortly.

The officials of the Seattle North Pacific Shipbuilding Company are: Judge John Twohy, chairman of the board of trustees; C. J. Erickson, president; Jas. W. Black, vice-president; James F. Twohy, secretary-treasurer, and John D. Twohy, general manager.



Miss Grace East, Sponsor of S. S. "Yaklok"

SEATTLE NOTES

(Continued from page 128)

Skinner & Eddy Corporation of the third and fourth units of the big new drydock contracted for by that concern. This drydock, which is scheduled to be completed in December and ready for operation by January 1, will be one of the largest in the country. It is built on the unit system, and is designed to lift 17,000-ton vessels.



Miss Edith Mercedes, sponsor, and party. Launching of S. S. "Edenton," Skinner & Eddy's first 9600-tonner

The Todd concern on Harbor Island is rapidly being completed, and for the past two months has been engaged in repair work. With the Skinner & Eddy concern entering this business and the Hefernan Engineering Company also operating a drydock, the local harbor will be prepared to execute all needed ship repairs expeditiously.

That the United States Shipping Board is perfecting a splendid organization throughout the country with a view to curtailing shipyard accidents and injuries, was the statement made by P. J. Brand, assistant chief safety-first engineer for the United States Shipping Board, who spent several days in Seattle recently inspecting the system in local shipyards. He complimented R. E. Warren, the local district safety-first officer, in the highest terms, saying that the safety system



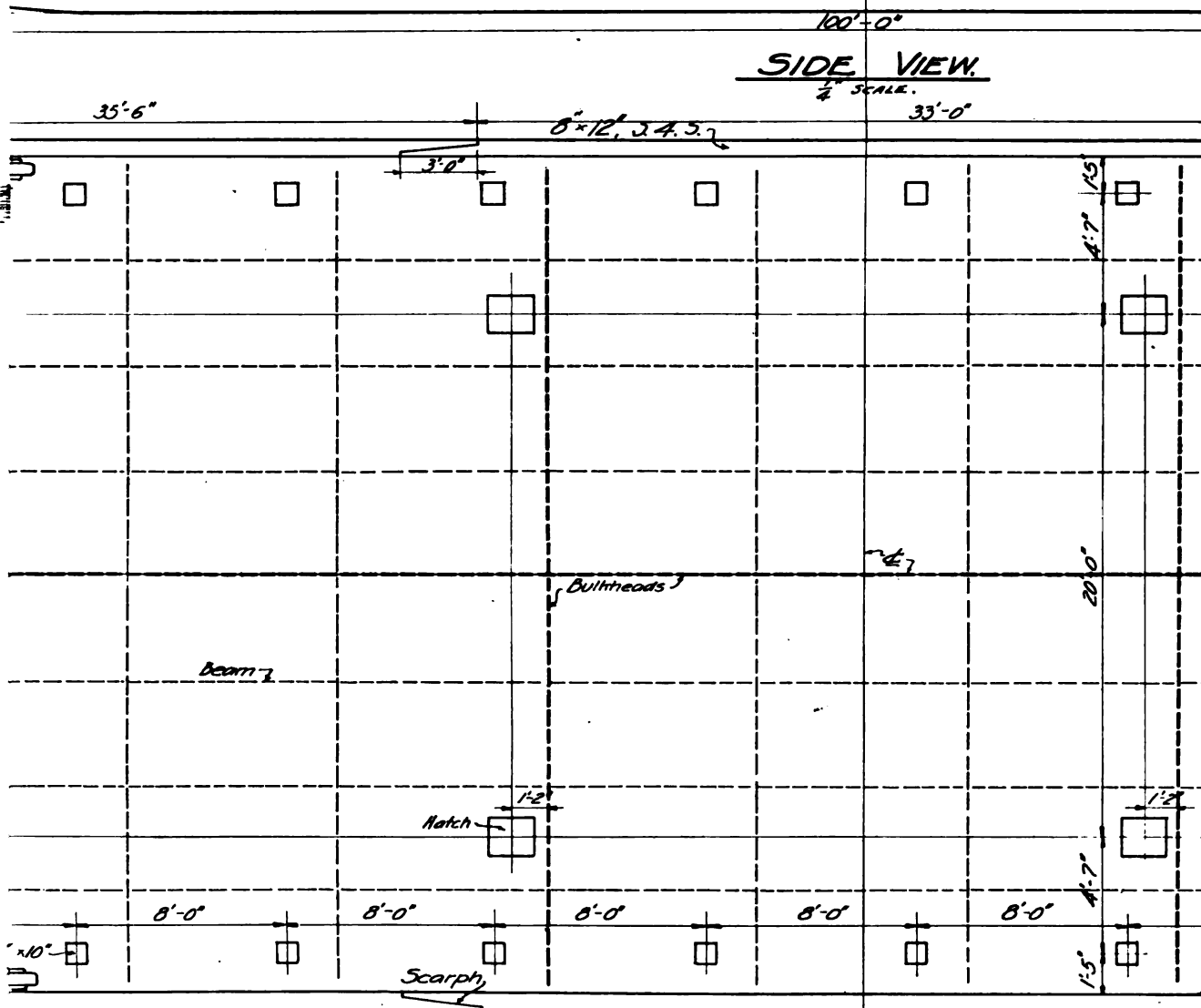
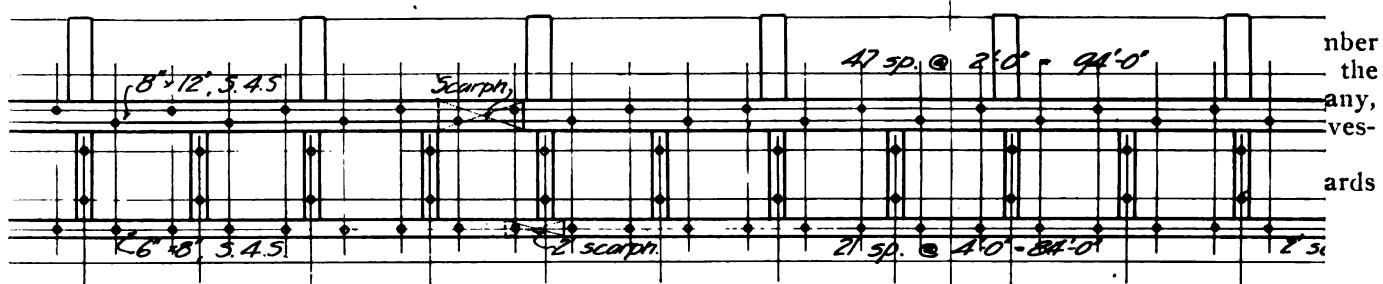
S. S. "Edenton" leaving ways at Skinner & Eddy yard, November 9, 1918

at the Seattle steel plants was the most efficient he had yet encountered.

In the past three weeks the Ames concern delivered two big steel ships to the United States Shipping Board. These steamships, the "Westmead" and "West Cape", both 8800 tons, were turned over to the navy for operation.

With General Manager John D. Twohy as president, the department heads at the Seattle North Pacific Shipyard recently organized a Foremen's Club, and adopted the motto "Let's Go" as the slogan of the organization.

The affiliation of Frank Waterhouse & Company of Seattle with the newly-organized International Shipping Company, is a monster new concern. Its announced purpose is to participate in the Seattle-Oriental commerce, and C. E. Harvey, formerly an official of the Waterhouse concern, and a staff of assistants, is now en route to the Orient to perfect arrangements. Thomas W. Sammons, United States consul general at Shanghai, has also affiliated with the new concern, and will probably resign his diplomatic berth. The new amalgamation will give the Frank Waterhouse Company large connections in the Orient and India, and will undoubtedly improve to a marked extent the shipping through this port.



400 Ton Concrete Bay Barge Built by the Concrete Boat Co. on Design Prepared

(See page 126)

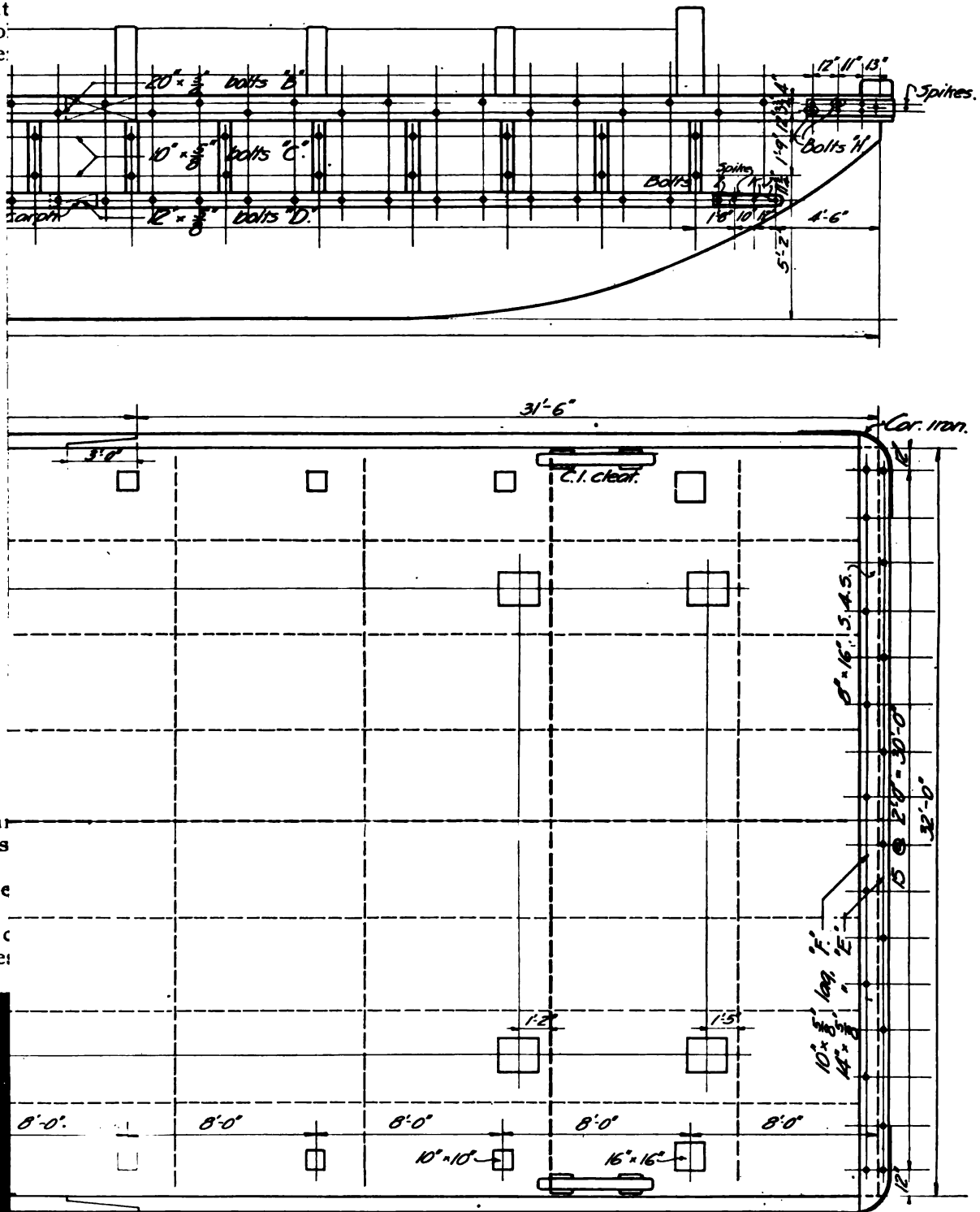
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by D. W. and R. Z. Dickie

"Going Some" In a Portland Yard

IN view of the fact that up to June 1, 1917, the site of the St. Johns, Oregon, Shipyard was a duck marsh, the achievements of this organization as set forth in a report from E. I. Cautine, resident inspector at the yard for the Emerg-

livered in District 11 was 26, of which number 15 were delivered by this yard, a credit to the Grant Smith-Porter Ship Company, Portland, of 57.7 per cent of all vessels delivered.

In this district, covered by the yards



ency Fleet Corporation, form a record of which the Grant Smith-Porter Ship Company are justly proud. Extracts from this report show that:

"Up to and including October 31 the number of keels laid in District 11 was 119, of which number 31 have been in this yard, a credit to the Grant Smith-Porter Ship Company, Portland, of 26.6 per cent of all keels laid.

Up to and including October 31 the number of vessels launched in District 11 was 67, of which number 23 were launched at this yard, a credit to the Grant Smith-Porter Ship Company, Portland, of 38.8 per cent of all the vessels launched.

Up to and including October 31 the number of wooden vessels de-

mentioned above, there are 56 ways on which vessels are being constructed, of which eight are located in the yard of the Grant Smith-Porter Ship Company, Portland, Ore. With one-seventh of the

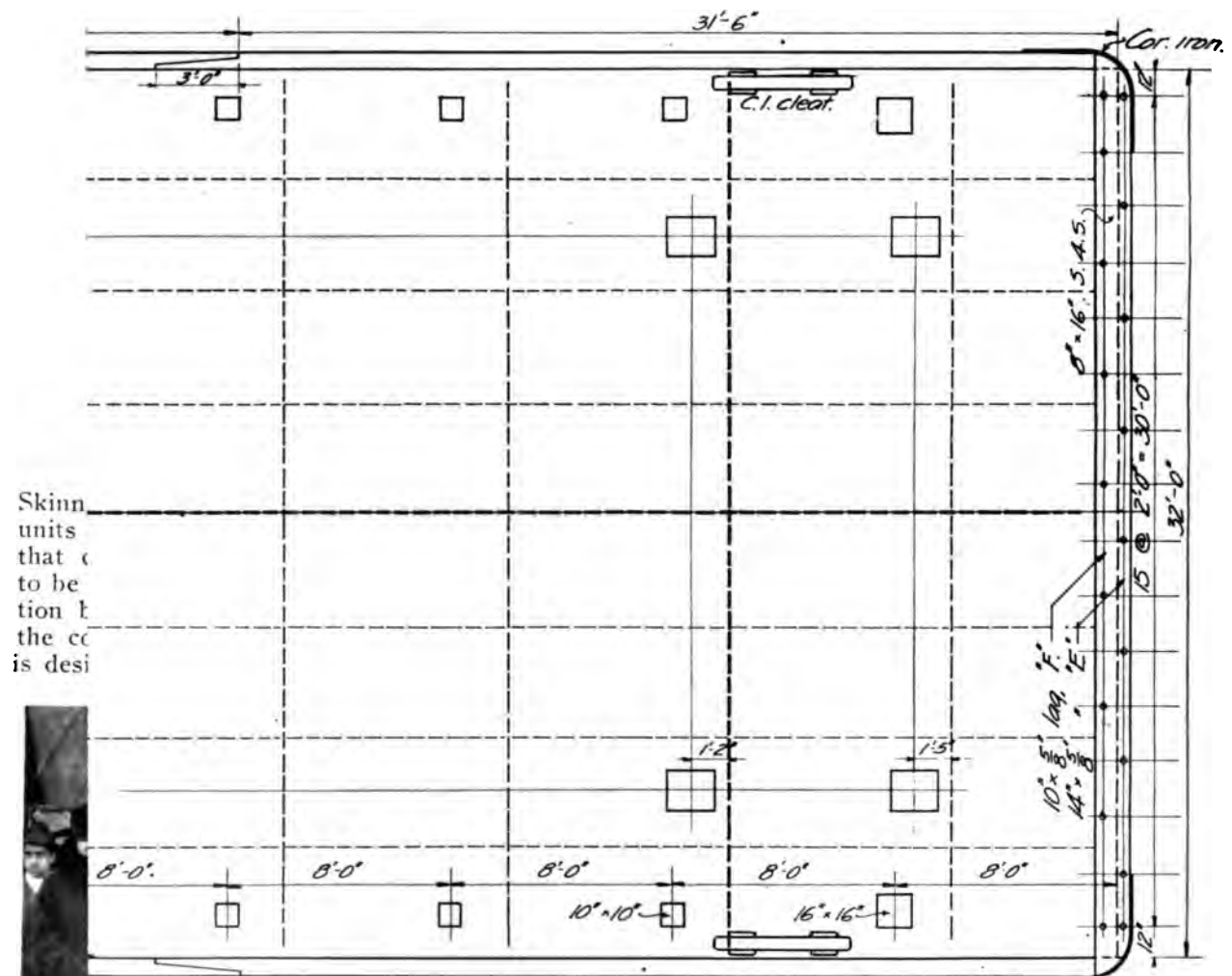
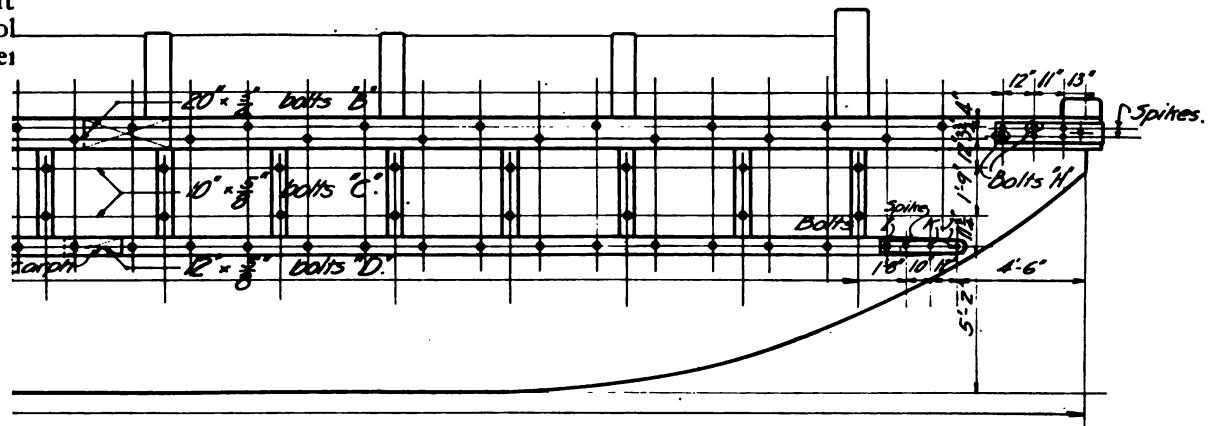
number of ways, or 14 2-3 per cent, the Grant Smith-Porter Ship Company, Portland, have laid 26.6 per cent of total number of keels, have launched 38.8 per cent of all vessels and delivered 57.7 per cent of all vessels delivered.

This delivery is exclusive of hulls constructed at Aberdeen, Wash. In addition to the delivery of 15 vessels, whose hulls were constructed at Portland, three vessels constructed at Aberdeen have been outfitted and delivered from Portland yard, making a total delivery from



The "Neeolah," just before launching July 4, 1918. The first Ferris type ship to leave St. Johns ways. Six ships of this type have been launched by the Aberdeen plant

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Skinny units that claim to be a solution to the obesity problem is designed

by D. W. and R. Z. Dickie

this yard of 18 vessels, or 62.1 per cent, up to and including October 31, 1918, of all vessels delivered in District 11, including Aberdeen boats.

"These figures are cited with pleasure to the credit of men and management of Grant Smith-Porter Ship Company's yard at Portland, Ore., and

worthy are at the end of their term as committeemen given a diploma and made honorary members of the organization. The results have been 40 per cent less accidents in July, 1918, as compared with June, 1918, and 50 per cent less accidents in August than in July.

The Grant Smith-Porter Ship Company since the organization of their St. Johns yard have won and retained every Blue and Red Pennant awarded by the United States Shipping Board for wood ship construction.

The Hough type wooden steamer "Caponka," launched at the St. Johns yard on April 24, forty-nine days after keel laying, has just completed a very successful trip to Manila from San Francisco.



The "Wasco," pride of the yard, and the first wooden ship to enter Government service

to the credit of the resident corps of mechanical and hull inspectors, as we have been given to understand that the quality of work is equal to that of any other yard in the district."

On July 3, 1918, the Grant Smith-Porter Ship Company initiated an organization for the safeguarding of the life and health of its employees. Over 200 foremen are now members of this organization, and each feels a personal responsibility for the welfare of the men in his charge. Twice a month meetings are held, and the accidents of the preceding fortnight tabulated, with location, causes, percentages of safety, etc. Through a system of safety inspectors, accidents are immediately investigated and responsibility fixed. The following record speaks for itself: July accidents, 117; August, 72; September, 86; October, 62. During these four months fourteen hulls were launched and two world's records established without a serious accident to anyone engaged in the work of construction. New men are met at the gate by inspectors, and properly instructed along safety-first lines. Pamphlets containing valuable suggestions are distributed among the men. Safety devices are installed on all machines regardless of cost, and the management arranges many noon lectures by experts. Workmen's committees of fifty are appointed every three months to co-operate with the foremen. The members of this committee who prove

NEW SUPERDREAD-NAUGHT

With the lifting of the voluntary censorship, it is now permissible to reveal that one of the great superdreadnaughts authorized in the 1916 three-year building program is well advanced in construction at the plant of the Newport News Shipbuilding & Drydock Company.

The keel of the 33,100-ton battleship was laid after the country went to war, and in spite of the call made on this yard for thirty-two destroyers to fight the submarine, work on the big vessel has progressed satisfactorily. The hull has taken shape and probably will be ready for launching within a few months.

This monster man o'war will mount sixteen-inch rifles in four turrets on the center line, two forward and two aft, and naval officials believe that she will be the equal, if not the superior, of any warship afloat. Another is to be built at the Newport News Shipbuilding & Drydock Company and two by the Fore River Shipbuilding Company at Quincy, Mass.



A view of a section of the yard in April, 1918. By this time several launchings had taken place and a national record established for speed in the building of wooden ships



The Month's Activities

By Special Correspondent

THE sudden termination of the war left the steel shipyards of Oregon well provided for in the way of orders for vessels, and with the assurance that the steel programme will be augmented as soon as the Emergency Fleet Corporation determines on the amount and class of tonnage required to enable the merchant marine to maintain its place among the shipping countries of the world.

The Northwest Steel Company, which was the first of the steel ship concerns to lay out a yard here, is assured all the work it can handle during the coming year. The Columbia River Shipbuilding Corporation is building 8800-ton carriers, and is well protected. The G. M. Standifer Construction Corporation, which is laying down 9500-ton ships, and will have its first in the water this month, is guaranteed full employment in 1919, while the Albina Engine & Machine Works, where 3800-ton steel ships are under way, will work up to next summer on its orders.

Recent apprehension in regard to the future of the government's wood ship programme prompted the Oregon Wood Shipbuilders' Association to take up the matter directly with the Emergency Fleet Corporation officials. A communication has been addressed to Mr. Schwab and Mr. Charles Piez of the Emergency Fleet Corporation to ascertain whether the government would have use for the plants and their maximum capacity, or whether the Fleet Corporation contracts might be finished, and the builders meanwhile accorded the privilege of accepting other business.

The success of Oregon-built vessels, few of which have been charged with construction troubles, has drawn attention to the yards of District No. 11. Inquiries are being made from abroad as to the probability of the yards accepting private contracts, hence the action in the way of bringing the situation to the attention of Messrs. Schwab and Piez.

It is said by the men who have lent their funds and energies toward assembling the war fleet of merchantmen, that virtually all the criticism directed against wood vessels is based on their type or some feature of their equipment, or emanates from persons unfamiliar with maritime matters. The criticisms ignore the fact that the ships have been built on government plans and specifications, under supervision of Federal inspectors, and, in short, are what was ordered.

Fred B. Pape, assistant manager of steel ship construction in the Northwest for the Emergency Fleet Corporation, spent the early part of November at San Francisco as an adviser in connection with an investigation of wood ships. He made the

trip at the request of Captain J. F. Blain, who, besides being the manager of steel ship work in the Northwest, has full sway over wood ship construction in Washington. Other than that the use of unseasoned timber, made absolutely necessary because of the emergency demand for tonnage by the government, and a few cases of poor calking by inexperienced men, both officers assert that there is no reason to discount wood vessels, and that the poor condition of a few built on the Coast is not chargeable to the builders.

Commenting on wood ships generally, Captain J. K. Bulger, supervising inspector of the United States Steam Vessel Inspection Service in Oregon, Washington and Hawaii, says that the condition of the "Fred W. Baxter," which struck at the entrance to Willapa Harbor early in November, and was towed here for repairs, is one of the best illustrations of how staunchly they can be built. In spite of the fact that the vessel lost her rudder, rudderstock, a small part of her keel, and damaged her sternpost, the hull was intact.

Immediately following the signing of the armistice with Germany, it was reported unofficially that the steamer "Westland," one of the 8800-ton freighters built by the Northwest Steel Company and launched in March, 1917, had been sunk by a submarine, and that all on board had gone down. If the report is true, this is the second of the Northwest's fleet to be lost, the other being the "War Baron," built for the Cunard Line.

Employees of the Grant Smith-Porter yard, approximately 5000 of them, have helped combat the results of influenza among their fellow workmen and families through weekly contributions of \$1000. Each man voluntarily subscribes 25 cents a week to the fund.

In Oregon shipyards the word has gone forth that all men not in the 100 per cent class as concerns the amount of work they shoulder daily shall be discharged. The "work or fight" rule no longer applies, but the "work or quit" rule is in full swing.

While Portland was a closed town during the epidemic, several theatrical companies were held in the city, and some of the male members found employment in shipyards.

On November 10 there were 16,300 tons of ships floated at Portland; the 8800-ton "West Wauna," launched at night by the Northwest Steel Company without ceremony, the 4000-ton "Corvallis" from the yard of the Peninsula Shipbuilding Company, and the "Fort Sill" from the Grant Smith-Porter plant. At the launching of the "Fort Sill" a moving picture was taken, completing a film that shows

the construction of a vessel from the time the timber is cut in the woods until the ship is in commission. Other vessels served to illustrate the more advanced stages of completion.

Between February 17 and November 17, 1918, the Grant Smith-Porter yard had launched twenty-four hulls, twelve of the Hough design and twelve of the Ferris type, while a total of twenty carriers had been finished, and delivered to the Emergency Fleet Corporation.

At the Vancouver, Wash., plant of the Motorship Construction Company, the average daily output is in excess of five completed lifeboats, and the management plans to exceed that showing.

Up to November 15 the Coast Shipbuilding Company had floated four hulls, and their program calls for the introduction of two more to the water before December is well advanced.

At the yard of the Supple-Ballin Shipbuilding Corporation, improvements were ordered during the month, mainly in the erection of a warehouse to cost \$5000. The corporation is meeting with signal success in the building of composite ships of the Fred A. Ballin type, with a capacity of 4500 tons. The same ships are under construction at the Vancouver plant of the G. M. Standifer Construction Corporation, and at the plant of the Kiernan & Kern Shipbuilding Company.

During November Petseyo Kosugi, representing the Kuhars Mining Company of Osaka, Japan, spent a few days in Portland. He was here twenty-five years ago and noting the changes which have occurred since that time remarked upon the wonderful growth. He is one of several Japanese steamship agents to cover the territory during the past few months, all seeking data relative to prospective conditions to follow the war.

No more important acquisition to Portland's coastwise trade has been recorded in years than the coming of the Pacific Steamship Company, which opened a most attractive office November first in the Railway Exchange building, completing a chain of Pacific Coast cities. Frank J. O'Connor, formerly in charge of the company's office at Victoria, B. C., has been selected to guide the destinies of the new agency at Portland.

Removal of the dredge "Chinook" from the mouth of the Columbia River to Charleston Harbor, which is being arranged for by the War Department, will be carried out soon after January 1, protests of Oregonians having been unavailing. The government's reply to objections is that there are no dredges on the Atlantic Coast capable of undertaking the vast yardage to be disposed of at the South Carolina port. It has been promised by General Black, chief of engineers, that the conditions at the entrance to the Columbia will be carefully checked every quarter, and should any dangerous change manifest itself, prompt measures will be authorized to correct the development. About three years ago the south jetty was completed, and a little more than a year ago the north jetty was declared finished. When the annual extensive survey was made in June of this year, it was found that object had been attained, there being a minimum depth of forty feet at the entrance over an area of half a mile. Thus the Columbia River bar has passed into history, and large vessels come and go hourly, regardless of daylight, darkness or tide. The improvement is held by engineers to be

one of the most extensive successfully completed in any harbor entrance of the world, taking into consideration the length of the south jetty and the width of the river, whose flow is now controlled by the breakwaters in such a way as to produce a natural scouring that operates continuously with at least part of the effect that the "Chinook" accomplished each summer. It is frankly admitted by shipping men that, while they feel that the "Chinook" should be held for another season or two to correct any shoaling or changes that might come about, the marine road there has stood up so dependably of recent years as to make it unlikely that extensive dredging will again be required.

By means of a forty-foot pole rigged under the dock, the butt end operated on rollers, while a cable from the butt end, running parallel with the pole, is laid to the edge of the dock and carried on pulleys to a capstan, Head Rigger Stewart of the Pacific Marine Iron Works feels he has found a means of moving vessels away from burning docks. When strain is placed on the cable by means of the capstan, the pole is protruded from beneath the dock, pushing the vessel away. In the case of a large ship, two poles would be rigged. Guiding cables from the end of the poles prevent them swaying.

Following a hard voyage, the schooner yacht "Eloise," owned by Dr. Andrew C. Smith of this city, reached Kodiak the first week in November, and will replace the steamer "Dora" on a mail route between Kodiak and Unalaska. The vessel was built in Boston in 1913, and was sailed through the Canal to Portland in 1915.

Captain William J. Haskins, who has been with the wood division of the Emergency Fleet Corporation for a lengthy period, first as inspector at the Standifer wood yard and later in charge of vessels lifted on drydock, has been named port captain by the Bureau of Operations, succeeding Captain Jack Speier, who is at Fort Douglas, Utah, having been commissioned a captain in the engineers and assigned to the 403rd regiment.

Shipment of flour from Portland during November was only restricted by the number of vessels available, and the same situation will prevail in December, as millers have been ordered to grind to capacity. It is believed that vessels from other ports will be assigned here to take care of the surplus movement, which is wanted in the countries stricken by war.

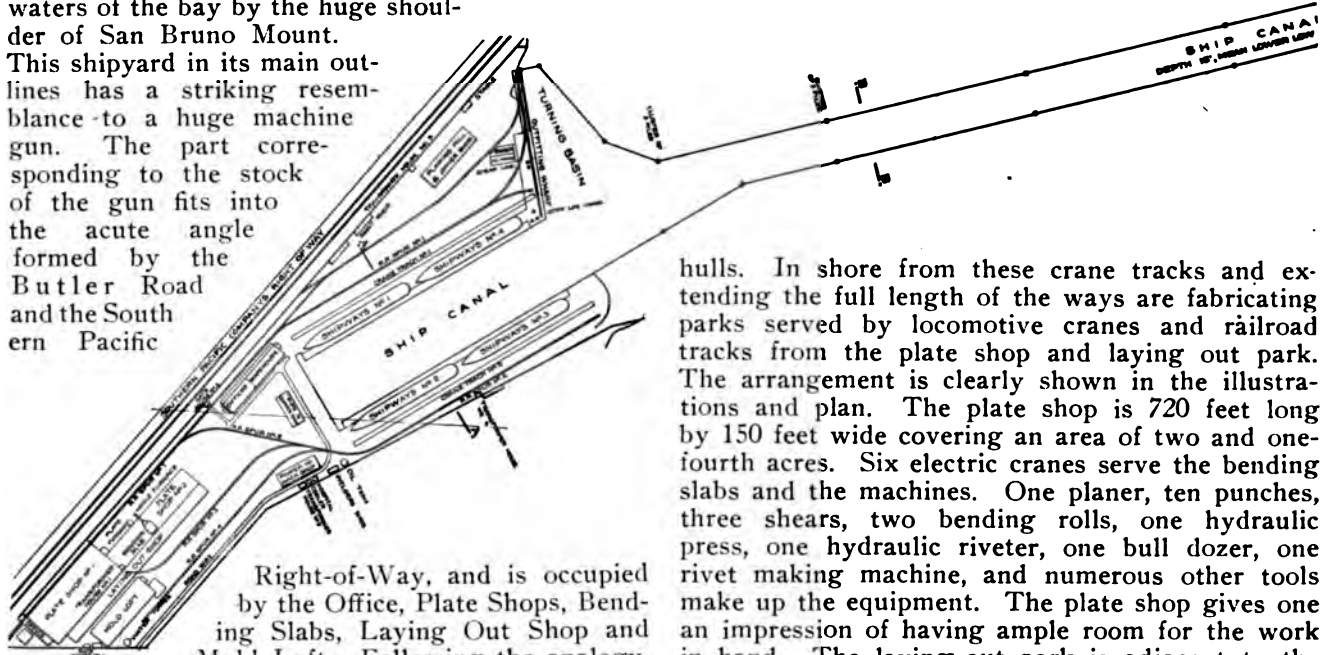
There has been received by the Port of Portland Commission a twenty-five-ton locomotive crane to be operated on the new coal dock under construction at St. Johns, alongside the drydock. The coal dock is to be capable of storing 5000 tons of fuel.

In sixteen months Portland has voted eight million dollars for port improvement. On June 4, 1917, a bond issue for three million dollars was approved by the people. On November 5, 1918, the citizens of Portland confirmed their determination to make Portland one of the great ports of the Pacific Coast by authorizing a second bond issue for \$5,000,000. The more recent issue will be used for a number of necessary port purposes, including a series of modern wharves and warehouses, immense lumber trans-shipment docks, a drydock of 12,000-ton capacity, coal bunkers, modern steam loading facilities, and ship repair shops which will compare with the best on the Pacific Coast.

The South San Francisco Ship Yard

As the evening south bound Southern Pacific trains run out of San Francisco along the bay shore and emerge from the last tunnel onto the dairy lands of San Mateo county, there will be noted a general stir among the passengers. Knitting, conversation, the favorite novel, even the "Call" or "Bulletin," are dropped, and all eyes are turned to the East, where directly alongside the railroad right-of-way lies the modern shipbuilding plant of the Shaw-Batcher Company Shipworks. And there is a strange fascination in the activity of the night shift, under the glare of the electric arcs, and the staccato drum fire of the pneumatic hammers reverberating from those big hulls, and echoed back across the quiet waters of the bay by the huge shoulder of San Bruno Mount.

This shipyard in its main outlines has a striking resemblance to a huge machine gun. The part corresponding to the stock of the gun fits into the acute angle formed by the Butler Road and the Southern Pacific



Right-of-Way, and is occupied by the Office, Plate Shops, Bending Slabs, Laying Out Shop and Mold Loft. Following the analogy, we find next an enlargement of the stock with the Power House on one side and the Warehouse on the other, leading up to the launching basin flanked by four building slipways with large fabricating park and outfitting wharf, all of which correspond to the magazine and firing mechanism of the gun, and deliver into the long ship canal or barrel of the gun the completed hulls, which are shot forth to take their part in the commercial life of the world.

When the Shaw-Batcher Pipe Works entered the shipbuilding program, they were faced by serious handicaps as to location. Their property lies in the sheltered cove between Sierra and Oyster Points, far inside the three-fathom line, and the establishment of shipbuilding works there meant digging a ship canal two miles long, 150 feet wide, and with a depth at low tide of at least 15 feet. This feature of the location determined the method of constructing slip ways for broadside launching into an enlarged basin at the inshore end of the canal.

All of the shops and plate handling facilities of this plant were designed especially to produce a Shaw-Batcher modification of the 8800-ton d.w. Ferris design Single Screw Freighter. The contracts now call for eight of these vessels, equipped

with four Heine boilers and 2500 h. p. Curtis turbines, to be delivered in 1918, and fourteen of same type equipped with three Scotch boilers and 2800 h. p. reciprocating engines, to be delivered in 1919. These vessels are 427 feet in length by 54 feet beam by 29.9 feet moulded depth.

Suitable piling was driven on each side of launching basin and the whole of the area to be used as building ways was floored with heavy planking. The basin 1000 feet long and 250 feet in width provides ample room for the construction of four 8800-ton vessels, two on each side. Tracks for cranes were laid along inshore side of building slips, and four electric tower derricks installed with sufficient swing to reach the full width of

hulls. In shore from these crane tracks and extending the full length of the ways are fabricating parks served by locomotive cranes and railroad tracks from the plate shop and laying out park. The arrangement is clearly shown in the illustrations and plan. The plate shop is 720 feet long by 150 feet wide covering an area of two and one-fourth acres. Six electric cranes serve the bending slabs and the machines. One planer, ten punches, three shears, two bending rolls, one hydraulic press, one hydraulic riveter, one bull dozer, one rivet making machine, and numerous other tools make up the equipment. The plate shop gives one an impression of having ample room for the work in hand. The laying out park is adjacent to the plate shop, and lies between that building and the mould loft. The term loft is a misnomer here, as the structure used is a one-story separate building 255 feet long and 80 feet wide, very well lighted, as is shown by the cut illustrating the full half breadth moulded lines laid out on the mold loft floor.

The side launching methods used at the Shaw-Batcher Works are worthy of special study. The keel is laid level and parallel to the edge of the launching basin. Scaffolding is used on both sides of hulls, that on the outboard side being erected by the aid of a floating barge derrick. The level keel and perpendicular frames give an advantage in lining up and fitting, and the average distance from fabricating park to location in hull is decidedly less than for end-on slips. When the hull is ready for launching, large timbers are laid on the planking of the building ships, at an inclination of one and seven-sixteenth inches to the foot. These form the stationary launching ways. On these, after thorough greasing, cribs of timber are erected on the inboard side, running about two-thirds of the length of the hull. These inshore cribs are built up solidly against the hull. Outboard of the keel, the cribs are erected in groups with wedges, set so that when the wedges are driven the weight



of the hull is brought down solidly on the inshore cribs and relieved from the keel blocks. Then three dog shores are set on each end of the old figure-four plan. Reference to the plan shown on our insert page will give a clear idea of this arrangement. Everything is made taut and then keel blocks and shores are knocked away, and the hull rests on the launching cribs, held in place only by the dog shores. At the signal six men cut the lashings with sharp axes and drop on the ways, for the hull slides over them in its "shoot" to the water. The success of this form of launching lies in getting sufficient headway so that the speed carries the hull clear off the ways as the out board bilge takes the water. Hulls have been launched successfully with a vertical drop of over four feet from top of stationary ways to water level.

The power house is equipped with compressors having a capacity of 8000 cubic feet per minute. The plate shop and fabricating park are equipped to fabricate 180 tons of steel per day when working at capacity. The electric cranes serving the hulls can handle to the ship 65 tons per ship every eight hours. Given the material deliveries, a hull could be launched from this yard every twenty-two working days. Approximately, 5000 men are employed and the weekly payroll approaches two hundred thousand dollars. Five hulls have been launched and two com-

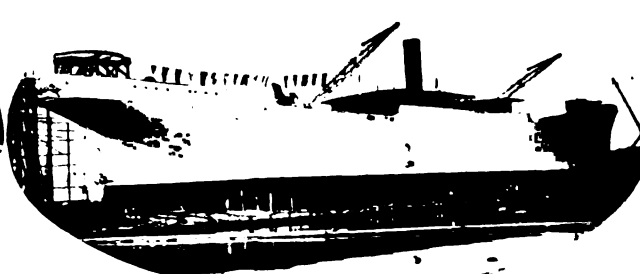
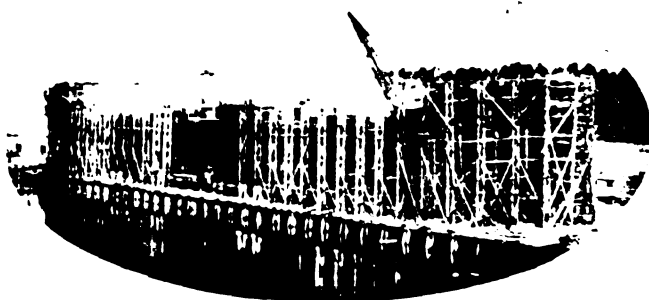
pleted vessels delivered to the Emergency Fleet, while a third is ready for her trial trip.

The "Man behind the Gun" in the Schaw-Batcher Company Ship Works is A. L. Becker, who has recently been appointed manager after a very arduous year as superintendent. Mr. Becker hails originally from Michigan and is a graduate of Ann Arbor, with the degree of Civil and Mechanical Engineer. He has had a wide range of experience as a ship builder and marine engineer, having held positions of responsibility with the Craig Shipbuilding Company both at Toledo, O., and at Long Beach, Cal. The position of superintendent, left vacant by the promotion of A. L. Becker, was filled by the appointment of O. B. Kibele, formerly yard superintendent at the Potrero works of the Union Plant of the Bethlehem Shipbuilding Corporation. Mr. Kibele's marine experience covers U.

S. Navy work in the Philippine campaign, operation of the Union Oil Company's fleet, and supervision of the construction of a number of vessels for the same company.



Upper View shows scaffolding on inshore side of building slips and one of the traveling tower derricks. Lower left shows hull on ways with out-board scaffolding in place. Lower right: Hull ready for launching with out-board scaffolding removed





Upper: Launch of "West Avenal." Center: Launch of "Oskaloosa." Lower: Triggers and dog shores set at stern with axmen ready to cut away lashings





Shipping and Foreign Trade Items

Following the announcement from Washington at the resumption of construction work will again be permitted and the necessary material supplied by the State Harbor Commissioners have decided to proceed immediately with the development of the San Francisco waterfront. Commissioner John J. McCallum made an official announcement regarding the work to be done as follows: The equipment of the piers with up-to-date labor-saving devices. The extension of existing short piers to the pierhead line. The construction of pier No. 1, adjacent to the Ferry Building on the north, for the use of bay and river commerce. The concentration of coastwise, with adequate waiting room for passengers and the provision of adequate facilities on Islais Creek for taking care of the rapidly developing Oriental oil business. The construction of docks and warehouses at Islais Creek to take care of through freight, having in mind vessels of increased tonnage, thus leaving the docks adjacent to the business section to be used for local freight. This improvement will be the first unit of what will, in the near future, be a great terminal. Warehouses adjacent to the Embarcadero and on the bulkheads between piers to take care of at least the overflow business. The adoption of a system of port charges as favorable to shipping interests as any on the Pacific Coast. The urging of the equalization of absorption charges on through freight by railroad companies, so that this port may no longer be at a disadvantage.

With the Legislature to assemble in less than two months, the proposal to level the Hunters Point ridge by hydraulicking it into the tidelands north and south of the Point is taking definite shape. About 2500 acres of industrial land north and south of the Point, and including the Point itself, as far west as Railroad avenue, will be added to the industrial area of San Francisco. To create industrial land, now difficult to obtain in San Francisco in large tracts, and possibly to provide a site for the "free zone", is the main object of the men who have this proposition in hand.

A recent arrival in San Francisco was the Liebes' whaling schooner Herman, which brought a cargo of 1400 barrels of salmon, 8000 pounds of whalebone and 2000 gallons of whale oil and \$60,000 worth of furs. This is the only vessel hailing from San Francisco that was on a whaling cruise this season. At the height of the whaling industry over one hundred vessels cleared from this city for the whaling grounds.

Captain J. M. Scott, president of the Scott Ship Agency Company of New York and Mobile, who arrived in San Francisco recently to see his steamer Alabama sail from San Francisco for the Orient, has a high regard for the wooden steamship. Captain Scott's company operates twenty wooden ves-

sels. It has established a steamship line between New York and France, with regular sailings. Several of its ships are being constructed on this coast. They will take cargoes to the Orient and then proceed to France.

Captain Isaac N. Hibberd, organizer and supervisor of the local sea training bureau of the recruiting service of the United States Shipping Board, has been appointed general supervisor of sea training, with headquarters in Boston. Hibbert is one of the best known shipping men on the Pacific Coast. As master of sailing ships in early days he established several records for speedy runs between Pacific Coast ports and England. He was at one time in charge of a large fleet of sailing ships operating in Alaskan waters. He was also superintendent of the old Pacific Coast Steamship Company, with headquarters at San Francisco.

In order to provide facilities for dry docking some of the numerous vessels constantly in need of repairs at this port, two floating dry docks soon will be under construction at the Hanlon Shipbuilding Plant at Oakland, according to Dan Hanlon. Each of the docks will be 300 feet in length and will have a capacity of 6000 tons deadweight, with two feet of freeboard. The docks will be so constructed that, if necessary, both may be placed under a single ship of 12,000 tons deadweight, an invention of Hanlon's.

The facilities for recalking and repairing wooden ships around San Francisco bay have been increased with the completion of the new marine ways at the Barnes & Tibbetts plant at Alameda. In addition to this, there will be other marine railways installed in the near future. The new Tibbetts ways will accommodate any vessel up to 5000 tons deadweight, and this will be more than ample to handle any of the wooden ships built on this coast and also big enough for a considerable number of the steel ships. The ways at the Moore plant are being repaired after the removal of the Shipping Board steamer "Coconino," which was jammed about one-half way from the bottom for many days. The local plants are expected to develop sufficient facilities to care for all of the wooden ships that may need the attention of the repair yards.

Fire broke out in the historic old Pacific Mail steamship "Pennsylvania," which has operated out of San Francisco for nearly half a century, and the vessel sank in the open roadstead of Iquique, Chile, on November 13, according to cable advices. Captain Liberoth and the crew escaped in the boats, but the vessel and 1800 tons of niter are a loss and cannot be salvaged owing to the depth of water. The history of the craft, which was built of iron at the Cramps Shipyards at Philadelphia, dated from the time it went into the Atlantic service in 1872 on the run between New York and Antwerp. It was known as one of the palatial liners of that day,

and when General U. S. Grant started on his famous tour around the world he left New York as a passenger on the iron ship. The "Pennsylvania" was then purchased by the Pacific Mail Company and brought to this coast. It was used on the run to Alaska for some time during the gold rush, and has for some years been employed on the run between this port and the lower and west coast. The steamer was 340 feet in length, 43 feet beam, 43 feet deep and 3400 deadweight tons. An offer of \$500,000 was refused by the owners one year ago.

Along the waterfront the remarkable performance of the destroyer "Ringgold" on her trial trip is the subject of amazed comment and of pride among the men of the Potrero plant of the Bethlehem Shipbuilding Corporation, where the warship was built. In a trial outside the heads the destroyer attained a speed of thirty-six knots, equaling the best record ever made by any vessel of her class. In a short-speed test the destroyer is said to have made an even better showing. The "Ringgold" is equipped with turbine engines which can attain 3600 revolutions a minute.

Drastic import regulations imposed by the War Trade Board have created havoc with shipping between the Pacific Coast, the Orient and Latin America, according to Robert Newton Lynch, vice-president of the San Francisco Chamber of Commerce, who has appealed by wire to Edward N. Hurley, chairman of the United States Shipping Board at Washington, to furnish relief at once. Unless the restrictions are removed, Lynch says, foreign nations will absorb American shipping business beyond regaining for many years. In his telegram asking for relief, Lynch pointed out that lack of eastbound tonnage from the Orient, both for domestic use and for reshipment to Latin America, has reduced rates as low as seven dollars a ton with consequent increase in westbound rates. This has resulted in later westbound shipments at high rates being given preference, with the result that 80,000 tons of freight are now on hand in cars and warehouses, with an average weekly arrival of 20,000 tons by rail. Ships have been withdrawn from Pacific trade to such an extent that the present tonnage cannot handle the weekly arrival by rail. The situation, the Chamber of Commerce official points out, has resulted in compelling many exporters and banks to carry financial loads beyond reason and will surely result in disaster unless immediate action is taken.

W. L. Carlson, of the Pacific Shipping Company of San Francisco, with offices in the American National Bank Building, has returned from an extended Eastern trip, during which he established offices in New York at 2 Rector street. This was done with a view to increasing their facilities as forwarding agents, and while numerous Eastern houses have opened offices here recently, it is pleasing to note that Pacific Coast firms are likewise branching out so as to be in a position to handle the largely increased business that is certain to materialize in the near future.

Y. Takakuwa & Company of Osaka, Japan, with offices in Honolulu and Seattle, have established their San Francisco office in the Alaska Commercial Building, K. Takakuwa being the local manager. They are identified with the mercantile interests of the Far East as importers and exporters.

The loading of vessels at this port for off-shore voyages is being seriously delayed on account of the permit restrictions imposed by the Government, according to the men in charge of ships on the berths for the South Pacific and the Orient. Before shippers can be assured of permission to load goods at the port it is first necessary to have forwarded from San Francisco the permits granted by the Government, and this involves a delay sufficient to make it impossible to forward the goods from Eastern points in time to get here before the vessel's sailing date. Thirty days are required to handle the correspondence between here and New York and twenty-eight between the Coast and Chicago, and it is impossible for the operators of ships to allow this amount of time for the transaction. It means, they say, that in order to fill a ship with this class of cargo, the vessel would have to be held back and this cannot be considered when bottoms are so scarce. The shippers are now urging the Government to permit the movement and loading of the merchandise following the exchange of official telegrams, but it is doubted from the present indications if this permission will be granted.

Chief Engineer Frank G. White, of the Board of State Harbor Commissioners, has announced that the molasses barge "Mohican," recently purchased from the Matson Navigation Company for \$25,000, will have the tank capacity enlarged from 370 tons to possibly 800 tons within a month. The barge will then be ready to handle bulk vegetable oils from the various vessels arriving here with bulk cargoes in the double bottoms. The barge is simply an experiment and is being installed by the State to prove the theory of handling bulk oils this way.

The Dutch steamer "Bintang," on the berth for Batavia and other ports of the East Indies, will take out on her December trip more than 600 tons of material to be used in the installation of adequate telephone service in various places. This is the biggest shipment of this class of goods to be sent from this port on a steamer in recent years and indicates that there will be a large movement of American manufactured goods to the Dutch East Indies in the near future.

The local committee of the United States Railroad Administration has recently announced that, beginning soon, carriers will absorb the entire switching charges of the Belt Railroad on import and export traffic moving over the wharves at San Francisco and on cars placed on tracks of the Santa Fe at Lombard street, the Western Pacific at Chestnut street, and the Southern Pacific at Drumm street. The absorption of switching on cars delivered at private industry tracks will be limited to \$2.50 per car. Further action is promised on this feature when the Interstate Commerce Commission has rendered a decision in the California Canneries case.

One more link will be added to the fast forging chain uniting San Francisco and the Orient when the Pacific Mail steamer "Santa Cruz" makes its first direct run from this port to Saigon, the capital of Cochin-China. The "Santa Cruz" is now preparing to leave on a voyage to Vladivostok under direction of the United States Shipping Board. No date has been set yet for this trip and when it is completed it is expected she will be reverted to the Pacific Mail and will depart on her voyage originally planned.

The Pioneer Wooden Shipyard of Southern California

IN and around Wilmington on the Mormoh Island Channel is centered the wooden shipbuilding activity of Southern California. The pioneer wooden shipyard in this district was "Chas. E. Fulton, Boat and Shipbuilder." In the spring of 1917 two ships were built at this yard, the "Edna Christensen" for Sunden & Christensen and the "Lucinda

L. W. Jutten, representing the Blankenhorn-Hunter interests, was appointed secretary. The new president set to work with characteristic energy, and soon had the plant operating under full steam.

The "Yehama", first hull launched at this yard for the Emergency Fleet Corporation, took the water on April 12; number two, the "Catawba," on June 11; number three, the "Mono," on July 4; number four, the "Cocopa," on August 19th. In the meantime two other contracts had been awarded the Fulton Shipbuilding Company, aggregating eight wooden ships of the Ferris type, the first of which will be launched about December 1, and one approximately every thirty days thereafter.

The S. S. "Yehama" was fitted out by the National Engineering Company, and sent to San Francisco, where she received a cargo for New York, and from all accounts made a very successful trip.

The Fulton Shipbuilding Company employs approximately 700 men and is fully equipped in every way for the construction of wooden vessels up to 5000 tons.

Robert Anderson has been general superintendent of the plant since January, 1918, and recently Sam Nelson, well known to shipbuilders and owners of the Pacific Coast, has been added to the executive staff as superintendent of construction. There are four shipbuilding ways, served by traveling tower derricks.

The employees and management are very proud of their records in Liberty Loan subscriptions. On the Third Liberty Loan the employees took approximately \$126 worth of bonds per man, and the yard was awarded the Honor Flag by the Treasury Department. On the Fourth Liberty Loan each man took \$175.77 worth of bonds, and won for the organization the flag given by the Industrial Commission of the City of Los Angeles to the winners of the competition between the shipbuilding yards of the San Pedro Harbor District. We believe that this record has not been exceeded by any shipyard in the United States.

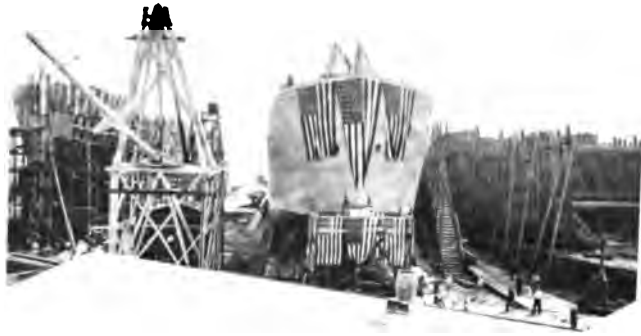


Hanify" for J. R. Hanify. These boats were afterward sold to the French government.

In July, 1917, Mr. Chas. E. Fulton combined forces with E. H. Seaver, and formed the Fulton Shipbuilding Company. The new organization closed a contract with the Emergency Fleet Corporation for the construction of four ships of the Hough type, and erection of a new plant was begun the first of August, 1917. Actual ship construction on the first hull commenced about October 1, 1917. Some time in January, 1918, Chas. E. Fulton sold his interests in the plant to the Blankenhorn Hunter Company of Los Angeles. E. H. Seaver then became president of the company, and



Old Glory on top with flags and pennants won by the Fulton Shipbuilding Company in Liberty Loan competitions. E. H. Seaver, President of the Fulton Shipbuilding Co., who is very proud of the wonderful record made by the men in his organization in winning these flags



Left: View of the beginnings of the yard of the Fulton Shipbuilding Company at Wilmington, Cal. Right: Hull ready for launching at the Fulton Shipyards. Lower: S. S. Yehama ready for launching

WOODEN SHIPBUILDING

The action of the United States Shipping Board Emergency Fleet Corporation in cancelling contracts for a large number of wooden steamers which were being built to their order in Northwest Pacific Coast yards is causing a great deal of dissatisfaction among builders of wooden ships and a good deal of critical discussion as to the wooden shipbuilding program.

In the January issue of "The Pacific Marine Review" the American industry of wooden shipbuilding will be given a thorough and critical overhauling, and we hope at that time to be able to show that wood will still have a large place in ship construction. Some of the most interesting

chapters in the history of shipbuilding on the Pacific Coast have been carved on wooden hulls. Much of the romance and charm of life on the Seven Seas is mingled with the spicy odors of our great pine woods, and we owe our former merchant marine glory in no small measure to the wonderful forests of our Atlantic and Pacific seaboards. So let us refrain from condemning the industry of wooden shipbuilding until we know the facts, for wooden steamers and old wooden windjammers in great plenty have testified in all weathers and all waters to the staunchness and seaworthiness of ships built of wood, and many of them are on the job today.



Events In and Around Astoria

By Special Correspondent

IN a recent survey, as reported by John H. Stevenson of the division of deferments of the Emergency Fleet Corporation, the five shipbuilding plants located at Astoria at the mouth of the Columbia are credited with the following number of employees: George F. Rodgers Shipbuilding Company, 652; Wilson Shipbuilding Company, 836; McEachern Shipbuilding Company, 1198; Astoria Marine Iron Works, 1237.

During the month of October sixteen vessels, with combined cargoes totaling 13,352,128 feet of lumber, were loaded at the mills of the lower Columbia River. Two of these vessels, carrying 1,552,128 feet of lumber, departed for foreign ports, and the remaining fourteen for California points. During the same period, fourteen additional vessels, loaded with 9,768,110 feet of lumber at upper river points, also departed from the port.

In order to permit and to encourage the utilization by the shipyard workers of Astoria of the estimated 500 vacant houses at Seaside and Gearhart and other nearby sea-resort towns, the S. P. & S., in co-operation with the Emergency Fleet Corporation, has recently announced very enticing commutation rates, amounting to six mills per mile plus five cents. For example, Seaside is nineteen miles from Astoria, and this rate brings the fare down to sixteen cents each way for war workers, provided they purchase a fifty-two ride commutation ticket good for one month only.

At the regular November elections George W. Sanborn, Frank Patton and George W. Warren were re-elected commissioners of the Port of Astoria. The two other members of the commission are President B. F. Stone and Alfred Kinney. The re-election of these men assures the continuation of the business policy that has resulted in the rapid development of the port during the past two years. This development includes the completion on Pier No. 1 of the port docks, the terminal warehouse with its four acres of enclosed warehouse space, and the building of the million-bushel grain elevator. Since October 1 the warehouse has been crowded to capacity with sacked grain, and the port commissioners could easily have utilized three times the available storage space. At the present writing the million-bushel grain elevator is 75 per cent filled, and with the arrival of the additional 175 cars en route it likewise will be crowded to capacity. In order to meet the growing port needs it is probable that the commissioners will soon be forced to complete the third unit of the eleven piers that have been projected along the 7,000 feet of water front owned by the port, which frontage, when fully utilized, will classify the port among the greatest and most efficient ocean shipping terminals of the Pacific Coast. Present developments now under way by the port include a double-track belt line railway around Smith's Point, almost completed, and ten

miles of additional terminal trackage. Supplementary projects under active consideration by the port include a steam or hydro-electric plant assuring abundant electric power for all related local industries, and the operation of a line of ocean-going vessels to insure the accommodation of the after-war shipping needs of the mouth of the Columbia.

The "T. J. Potter," one of the historic old steamers of the Columbia River, has been "doing its bit" during the war. When the housing problem at the mouth of the Columbia became acute, some months ago, the McEachern Shipbuilding Company of Astoria commandeered the old side-wheeler, towed it alongside their plant, and transformed it into a comfortable house-boat for some scores of their war workers.

The British steamer "Ballata" sailed from Astoria on November 9 for Sydney, via San Francisco, after having been tied up several weeks for repairs, including a new rudder and the overhauling of her engines, at the plant of the Astoria Marine Iron Works.

One of the recent departures from the lower Columbia River is the steamer "West Coast," which took on a cargo of flour from the port of Astoria warehouse. Other vessels which have taken on cargoes of flour, loaded in part at the port of Astoria docks during the past few months, are the "Western Scout," the "West Indian," and the "West Grove."

On Saturday, November 16, on Pier No. 2 of the port of Astoria docks, was celebrated the first anniversary of the founding of the Astoria Marine Iron Works. The celebration took the form of the raising of a flag, which was formally presented to the plant by acting Mayor Johnson, in behalf of the city of Astoria. The flag was accepted by A. W. Viggers and Thomas Bilyeu, president and general manager, respectively, of the Astoria Marine Iron Works. This plant was one of the last in the Columbia River district to receive contracts for the final fitting of Government wood ships, yet at the present writing it has completed five of the twenty-six finished Government wood ships of the district, and it has scheduled three additional trial trips before November 30. The ships successfully completed by the Astoria Marine Iron Works are the "Quoque," the "Astoria," the "Lonoke," the "Salmon," and the "Makanda." The ships scheduled soon for trial trips are the "Bonifay," the "Blue Eagle," and the "Benvola."

The three shipyards located in Astoria, at the time of this writing have launched a total of twenty-four Government wood ships of the Ferris and the Hough types, and it is expected that at least six additional ships will be launched before January 1. Of these ships the McEachern yard has launched sixteen, the Wilson yard five, and the Rodgers yard three.



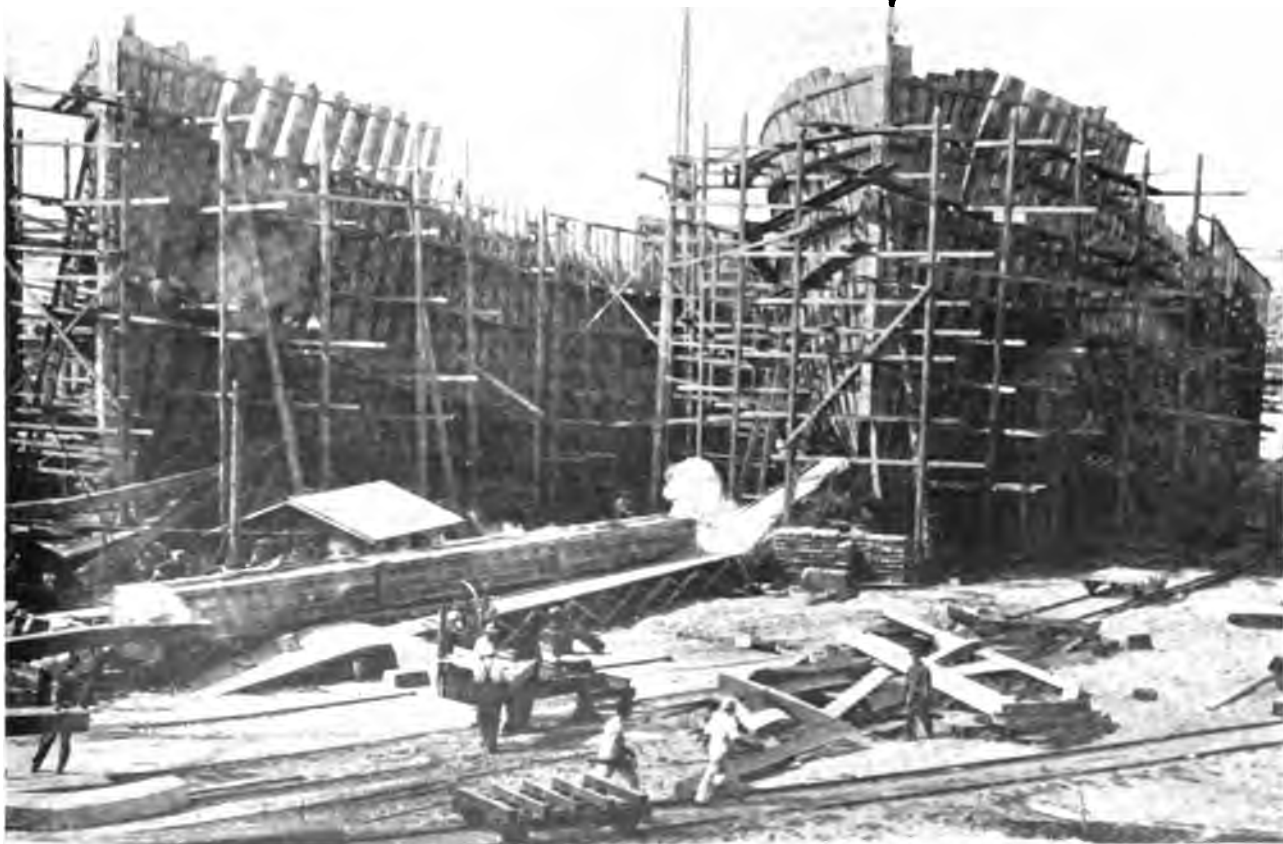
Steamship "Bellota" built by the Ralph J. Chandler Shipbuilding Company

A New Mormon Island Yard

Among many wood shipbuilding yards that have recently sprung up out of the mud flats and sand dunes along our coasts, the Ralph J. Chandler Shipbuilding Company of Wilmington is remarkable in having a double deep-water frontage, so that timber can be delivered at one side of the yard, either by water or rail, and have a direct progress through the various processes necessary to put it into condition for its place in the hull which will slide off the ways in the same general direction into the Mormon Island Channel at the other side of the yard.

There are four shipbuilding ways, and as soon as a ship is launched another is started. The firm holds contracts from the Emergency Fleet Corporation for six wooden vessels of the Ferris type, 281 feet in length. One of these, the S. S. Bellota," has been completed, and is now on her first voyage; others are well under construction.

Ralph J. Chandler, the executive head of the firm that bears his name, is a very popular young man with all who know him. He has the business of shipbuilding well in hand and has a future of much promise in that industry.



Two wooden ships partially framed at the yard of the Ralph J. Chandler Shipbuilding Company

Suggestions From a Noted Maritime Attorney

By Peter O. Knight, Vice-President and General Counsel International Shipbuilding Corporation

EXIT the dreamer, the demagogue, the Socialist and the Bolshevik!

Enter the sober-minded American people, represented by capital and labor standing shoulder to shoulder, each with confidence in the other and dealing justly with the other—and America, "now straddling a keg of powder which the long-haired gentry are striving mightily to explode," will be spared the madness that has thrown Russia and Central Europe into chaos.

Or, exit the latter, and enter the former, and "there will be hell to pay!"

Thus did Peter O. Knight, vice-president and general counsel of the American International Shipbuilding Corporation, sum up today the situation in the United States, brought about by events immediately preceding the war, the war itself, and its sudden and unexpected climax.

"There must be no rocking of the boat," said Colonel Knight, "or there will come in this country such a crash, financially and industrially, as the most pessimistic never dreamed of!"

Colonel Knight made this statement shortly after his return to his offices here from Washington, where he spent the week-end conferences with high Government officials and members of Congress. He said that he was simply expressing his personal views and "not voicing the opinion of any organization with which I am connected."

Confidence Makes Prosperity

"Confidence alone makes prosperity, and the want of it produces a panic," declared Mr. Knight. "The working man has a full dinner pail when there is prosperity and an empty one when there is a panic or depression. He, therefore, is more vitally interested in this situation than is the business man; for with the business man it is more or less a question of dollars, while with the working man it is a question of his bread and butter.

"There must be no rocking the boat, now! There should be no organization of Congress for the purpose of working out reconstruction problems along partisan lines. There should be no throwing of brickbats, and city, State and National Governments must adopt a different attitude toward capital and big business from that which prevailed for the twelve or fifteen years prior to April 6, 1917.

"Capital, the business interests, and labor should all be placed upon the same basis so far as governmental interference or non-interference is con-

Philadelphia, Pa.,
November 19, 1918.
Editor Pacific Marine Review,
San Francisco, Cal.

I have read with considerable interest the reprint from your issue of April of the article "Why Not a Maritime Congress?" Why don't you send one of these reprints to every member of Congress?

I had sent to you several days ago copy of an interview that I gave the Evening Ledger of this city, thinking probably you might desire to reproduce it.

My views are that before we can secure the repeal of any legislation or the enactment of any remedial legislation, the people of this country must be thoroughly educated to the fact that this is a question that affects every man, woman and child in the United States. That has not been understood by the people of this country hitherto, nor is it yet. A thorough campaign of education should be started all over the United States, and if the people are once thoroughly aroused to the necessities of the situation, the question of what legislation is necessary, will be a detail.

You are certainly doing magnificent work.

Yours very sincerely,

P. O. KNIGHT,

cerned," continued Colonel Knight. "One is entitled to the same rights as the other; they are all entitled to a square deal and no more. Capital and the business interests should have the positive assurance the spirit that pounded the railroads into insensibility and forced the Government to take them over for the purpose of saving eighty per cent of them from going into the hands of receivers, is dead and gone!"

Too Many Essays

"The business man must have optimism, and not be branded as a menace to the country if he is to go on with the tasks in front of him. The Government should eliminate itself from control as rapidly as possible. The majority of the people do not want Government ownership of public utilities, or of industries, or of anything else. All boards, commissions and bureaus, State and National, that are not essential—and God knows about 90 per cent of them are absolutely unnecessary—should be abolished immediately.

"Let us again have a Government by the Constitution, instead of one by bulletins, theses, tracts and rainbow-chasing essays!"

"If a man has an income of \$10,000 per annum, he cannot spend \$15,000 per annum very long and keep out of bankrupt-

cy. In other words, we must all stand together in this most critical time in our history—working man, business man, capitalist, and City, County and State officials, if we are going to carry on. If we do not, hell is going to be to pay!"

Anarchy in Europe will not be maintained at the expense of the American people, Colonel Knight declared. To do that would be to build up and support a more serious menace to the safety of the world than that which has just been overthrown, he said.

"I think that Germany, Russia, and other Bolshevik governments should be told that, unless they establish stable form of government, where all will have equal rights, whether rich or poor, we cannot, nor will we, give them the assistance they are asking," he insisted. "It will be hard enough, under the most favorable circumstances, for the American people to make sacrifices to aid Germany, anyhow.

\$57,000,000,000 Appropriated

"Now, if we had only our own country to take care of, the task ahead of us would be stupendous. But when you consider that we will largely be compelled to aid in taking care of the rest of the

world, the task ahead of us is certainly superlatively herculean, but it can be done.

"Since April, 1917, \$57,000,000,000 has been appropriated by Congress for governmental purposes. This is greater than the total wealth of either France or Russia in August, 1914, when the war started, and greater than the combined wealth of Norway, Sweden, Belgium, Bulgaria, Rumania, Serbia, Holland and Denmark at that time. From Appomattox to Liege there had been expended by the United States for governmental purposes only \$21,000,000,000, and from the time of its beginning to August, 1914, there had been expended by this country for such purposes a total of only \$27,000,000,000.

"Prior to the beginning of the world war our annual governmental expenditures were about one billion dollars. There is only \$9,000,000,000 of gold in the entire world; there is only about \$5,500,000,000 of gold and silver in the United States. The total resources of all the banks in the country, national and State and trust companies are only about \$37,000,000,000. The national debt of the United States in 1914 was only \$990,000,000.

"These facts are enough to make any thoughtful man sit up and take notice. On the whole they are rather startling. While it is true that all of the fifty-seven billion dollars appropriated will not be expended, no one knows, until there has been an adjustment of all outstanding contracts, how much of it will have to be expended.

Return to First Principles

"Now that our problem is set clearly before us, how are we to solve it?

"By the Government gradually eliminating itself from this situation, and having the rights and liberties that our forefathers fought and died for restored to the people.

"For a period of about twelve years prior to April, 1917, there was a mad race toward Social-

ism by both political parties, and every attempt possible was made to overthrow those principles upon which our republic was founded and which must continue to prevail if it is to be perpetuated.

"The average American is an individualist absolutely, no matter what his status in life; whether he is rich or poor, he wants to be let alone. So it is with the business interests of the country, and the vast majority of them want no aid from the Government; they want simply to be let alone. Until April, 1917, they were busy fighting the demagogues and well-intentioned dreamers. They need now all their mentality for constructive work. Why not give them a chance to achieve something for the common good?

"We are sitting with bated breath over a potential earthquake. If we keep our heads, obey the dictates of reason, and exercise sound common sense, we cannot fail. If we lose our head and our nerve, or pause to listen to theorists—well, there's Russia and there's Germany and there's Austria-Hungary, where brother is clutching at the throat of brother, and all are begging for bread.

His Faith in People

"Yet in spite of conditions threatening us, I have sufficient confidence in the sober common-sense ability and humanitarianism of the American people to feel optimistic rather than pessimistic over the future. I think that the business interests of the country can well afford to take the American people into their confidence. They always are ready and willing to do the right thing, for it is their nature. They have never failed to meet any crisis or emergency when they understood what was required of them, and they will not fail now if the well-informed people will come forward and lay the facts before that greatest and fairest of all earthly tribunals—the average American."

Freight Report

By Page Brothers

IT is a difficult matter to write about freights, as the stoppage of war has brought about a sudden lack of demand, and foreign buyers no doubt feel that such conditions should weaken freights. As far as local owned sail vessels are concerned a period of at least four months or so, will have to elapse before vessel tonnage need press on the market, as nearly all such tonnage has already been chartered ahead, and as restrictions have been withdrawn and lumber can be used for building purposes, and for railroad materials, in the United States, our steam schooner class of vessels, some of which have been running to the West Coast of South America on the basis of \$45 per 1,000 feet, returning with nitrate at \$25 per ton, which is better than doing coast-wise business, may find business at home in preference, as the stoppage of the war has put a ban on importation of nitrate, and some steam schooners took lumber to the west coast and are now bound there without having closed for return cargo. The prospect seems that they may have to come home in ballast and some that have gone to the Orient will hardly be able to get a freight from the Orient at freight of \$50 per ton. Al-

though there is plenty of cargo, shipment is handicapped by U. S. Government restrictions.

A resumption of business on this Coast, even at rates that have been current, is their principal salvation. Will it come about, or will the demand still continue poor, notwithstanding that the Government has had the restriction on for such a long time? That is the point.

The U. S. Emergency Fleet Corporation has many steamers still being built, and we presume most of them will be used to transport the millions of tons of foodstuffs that will be necessary to keep the nations of Europe alive, and as those nations won't have anything to export for some time, except troops to many parts, vessels will have to depend to a great extent on earning a freight that will have to reimburse them for a return trip in case they have to return in ballast—of this we must acknowledge our ignorance.

It is rumored that the Emergency Fleet Corporation intend to run their vessels at cost, probably for the shipper's benefit. We presume if it is intended to run them at cost it will be for the shipper's benefit, and for the purpose of keep-

(Continued on page 148)

FIREMAN'S FUND

Insures Hulls, Cargoes,

HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

G. KIRKHAM SMITH, Special Agent
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

Hull Insurance

I. Basic Principles and Elements of Contract

By Benjamin Rush

President Insurance Company of North America

IN view of the rapid strides towards the acquisition of a Merchant Marine, now being made by the United States, the present time is a particularly apt one in which to recite the principles of marine insurance in so far as they are applied to what is generically termed "Hull Insurance."

It will clarify these remarks if I recite certain peculiar unwritten understandings, which although they do not appear anywhere on the face of a marine policy are nevertheless well known and thoroughly understood in the mercantile business, and are enforced by the courts.

The first is that the insurance contract being a contract of good faith will fall to the ground, in whole or in part, in the event of fraudulent practices by either party to the contract, therefore, it is an implied condition in every contract of marine insurance that the person who proposes the risk to an underwriter shall communicate every material fact, which is within his exclusive knowledge, to that underwriter, unless the terms of the policy are such as to render such communication superfluous.

He must tell everything he knows which he thinks might influence the underwriter's judgment either to accept or decline the risk, or even to increase or diminish the premium charges; furthermore, he must not conceal anything which might induce the underwriter to decline the risk, or which, were it known, might influence the underwriter's judgment in any of the above particulars, and it makes no difference whether this concealment results from ignorance or design, it will be equally fatal to the contract.

Another understood necessity of the contract of insurance is that the assured shall have an interest in the subject at risk; he cannot simply bet or wager on the safe arrival of this or that ship if he has no interest in her.

Wager policies, as they are called, have long since been pronounced illegal, and they cannot now be enforced in any court in this country or in England.

Another implied warranty, as it is called, is

that every vessel shall be seaworthy, and that she shall pursue her voyage without any undue delay or deviation from any of the established usages of trade or navigation; and finally that the adventure must be a legal one both as regards its business nature, and the mode in which it is prosecuted.

A great many cases have come before the courts, and a great many books have been written to define just what constitutes seaworthiness; a brief definition is thorough fitness in all respects of the vessel named to pursue her voyage to its destination, and to encounter the ordinary perils, which must be met with in so doing.

Neither the ignorance nor innocence of the assured will avail to relieve him from a breach of this warranty.

As regards voyage insurance on hull, it is to be noted that the warranty of seaworthiness may be subdivided, thus the degree of seaworthiness required of a vessel lying safe in port, is less than would be necessary for navigating the ocean. As regards the hull underwriters, the warranty of seaworthiness is satisfied if a vessel is seaworthy for that portion of the voyage which she is about to undertake.

While lying in port she must be seaworthy for the risks of the port, and be in condition to move to and fro in that port for the purpose of outfitting or loading cargo.

When she leaves such port a higher degree of seaworthiness attaches.

If the voyage contemplates a river or lake transit prior to reaching the ocean, she must be sufficiently seaworthy to encounter the ordinary risks of such river or inland body of water, and when she finally goes to sea, she must be fully seaworthy in every respect to encounter the ordinary risks and perils of the sea.

As regards a time policy on hull, it is an old axiom that there is no warranty of seaworthiness in a time policy. This is because in a time policy a vessel is or may be out of the control of the owner at the time the policy may attach, and the owner

INSURANCE COMPANY

Freights and Disbursements

STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Special Agent
230 BYRNE BUILDING
LOS ANGELES

O. G. ORR & CO., Managers
ATLANTIC MARINE DEPARTMENT
37-43 WALL STREET NEW YORK

AND BRITISH COLUMBIA, 264 COLMAN BUILDING, SEATTLE, WASHINGTON

may be, and frequently is, in entire ignorance of her physical condition at that time.

The only exception to the rule is that unseaworthiness known to the owner, and allowed to continue by him after he has an opportunity to remedy it, will void the policy.

It should also be remembered that the very essence of the contract of Marine Insurance is indemnity. Its sole and exclusive object is to procure for the assured indemnity in the strictest sense of that word, and consequently its whole spirit would be violated if the assured were to make the occurrence of any casualty insured against, a means of gain, for this would be to give him an interest in procuring sea losses, which would be opposed to every principle of commercial policy.

Marine Insurance may briefly be said to be a contract whereby one party for a specified consideration agrees to indemnify another, who is interested in property exposed to marine risk, against loss incidental thereto.

The instrument by which the contract is made is called the "policy."

The person who undertakes to indemnify the other is called the "insurer," or "underwriter," and the consideration which he receives for so doing is called the "premium;" the person protected by the policy is called the "insured" or "assured;" the thing covered by insurance is called the "subject," and the substantial concern which the insured person has, in the preservation of the subject, is called his "interest."

The obligation assumed by the underwriter, regarded as a whole, is termed the "risk," and the specified danger is the "perils insured against."

A policy of sea insurance is not valid unless it specifies a particular risk or adventure, the names of the underwriters, and the sum or sums insured.

Policies on hull may be either valued or unvalued.

A valued policy is described as a policy which specifies the agreed value of the subject matter insured, and an unvalued policy is the opposite. It does not specify the value of the subject matter insured, but leaves this to be subsequently ascertained.

As the value of a ship is a more difficult thing to prove than the value of other kinds of merchandise or property, ships are almost invariably insured under valued policies.

A ship may be insured for a specified voyage or for a period of time; if the former, the place where the voyage begins is called the "terminus a quo," and that at which it is to end is called the "terminus ad quem."

A time policy covers a ship for a specified period of time, say from the 1st of January, 1918, to the 1st of January, 1919, and as time varies in different parts of the world, it is usually specified either as Greenwich or Washington time.

There may also be combinations of these two policies, such, for instance, as a voyage from New York to Buenos Aires, and for thirty days thereafter.

SOME CANVAS

Nearly seventeen acres of canvas were used by Erland & Company, Inc., of Seattle, in equipping sixteen of the Foundation Company's Tacoma-built wooden carriers with sails, the contract being the largest single one of the kind in the history of Puget Sound. It was completed by the Seattle concern recently and involved an expenditure of more than \$100,000.

Work on the contract was begun by Erland & Company last December and eight of the firm's sail-making machines ran continuously in carrying out the great order. Incidentally, the job gives a hint of the extent to which Seattle benefits from wooden shipbuilding in the other ports of this State. The majority of the carriers built in the other Washington ports come to Seattle for their equipment and supplies, bringing a constant stream of outside money to the Elliott Bay waterfront.

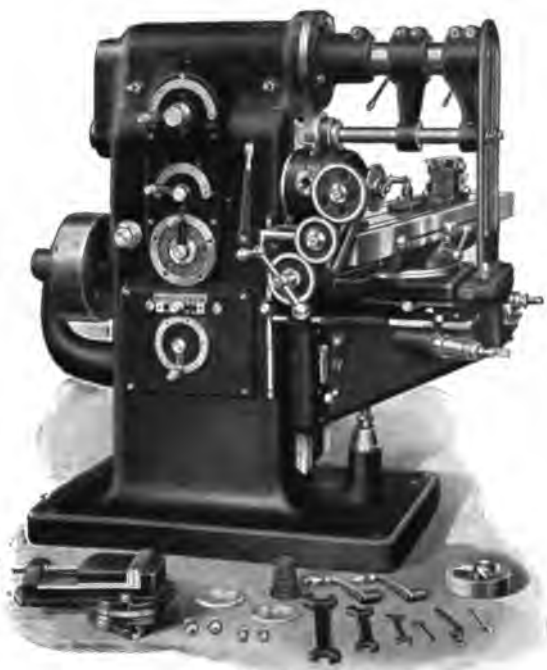
The ships built by the Foundation plant in Tacoma were ordered by the French government. All told, twenty big auxiliary-powered wooden schooners were built for the French and the Erland plant obtained the contract for equipping 16 with sails.

In fulfilling the contract, the Erland plant used 725,760 square feet of canvas, or virtually seventeen acres. It also used nine and a half tons of rope and two and a half tons of hardware, the latter including cringles, thimbles, clew rings and grommet rings. The cringle is a round ring, while the thimble is an oblong ring. The grommet is the round solid ring used at the reef points in the sails.

The Seattle plant handled the contract on schedule, fulfilling the huge order without halt or delay, keeping up the old reputation of the port for efficiency in such work.

Machine Tools IN STOCK

IMMEDIATE DELIVERIES



Rockford No. 2 Universal Miller

IN STOCK

Cincinnati Shapers, Cushman Lathe Chucks, Carlton Radial Drills, Badger Punches and Shears, Foster Screw Machines, Foster Turret Lathes, Hamilton High Duty Lathes, Merrell Pipe Machines, Ott Universal Grinders, Rahn-Larmon Lathes, Rockford Drilling Machines, Rockford Milling Machines, Racine High Speed Saws, Schieren Leather Belting, Sidney Engine Lathes, South Bend Small Lathes, Swaine Power Presses, Universal Bolt Cutters, Westinghouse Motors, New Yankee Grinders.

HERBERTS MACHINERY AND SUPPLY COMPANY

OFFICE AND SHOW ROOM

Corner Third and San Pedro Sts., Los Angeles

FREIGHT REPORT

(Continued from page 145)

ing its new mercantile fleet busy. This rumor we cannot confirm.

Another point to be figured on, to compare conditions on, as against the tonnage existing prior to the war, is the fact that the Panama Canal is now open, the shortness of the trip on most voyages will make a vast difference on the number of vessels that can do the world's business. It is stated that the present tonnage of the world already launched is within 7½ per cent of being as large as previous to the war, and many vessels are still being built by the different nations. Will it be overdone again at high cost, and as prices for manufacturing come down, which they no doubt will in time? What effect will it have on freights? Really each one must guess for himself.

AN ANNOUNCEMENT IMPORTANT TO SHIPBUILDERS

All those interested in marine steam equipment will be glad to welcome the announcement that the James Howden & Co., Ltd., of Glasgow, Scotland, have established a manufacturing branch in the United States. The new plant will be located at Wellsville, New York, and work is already under way. A force of draughtsmen and engineers from the home office of the company has been sent to this country and are now employed at Wellsville supervising the construction of buildings.

The James Howden Company has enjoyed for many years a splendid reputation, and their products are in certain lines almost standard practice. Indeed, in marine practice the words "Forced Draught" and the name "Howden" are almost inseparable.

That this ultra conservative British firm has decided to manufacture on this side may be taken as an evidence that shipbuilding in this country is on a more firm basis than that which the mind of some of our pessimists is willing to grant. We may be very sure that this move has been given due consideration and that action came only as the result of a firm conviction that for many years to come business on this side would warrant the added manufacturing and overhead costs.

Amid scenes of wild enthusiasm Mrs. Judge John Twohy of Portland burst the bottle over the 9400-ton steel steamer "Iconium" here on November 26, it being the third vessel launched by the Seattle North Pacific Company. The keel of this ship was laid eighty-one days ago by Judge John Twohy, assisted by Major Hanson of Seattle. Among the guests were Mr. and Mrs. James F. Twohy of Seattle, Mr. and Mrs. John D. Twohy of Seattle, Mrs. Curran of Seattle, Mrs. M. S. Boss of Seattle, Mrs. James O. Donnelly of Portland, and Mr. Edmund P. Twohy of Spokane. The Seattle North Pacific Shipbuilding Company has in hand ten contracts for the Emergency Fleet Corporation. This is the organization which shattered the world's record for first production of new yards, having launched its first vessel, the "Ozette," within 84 days after the keel was laid, which occasioned wide comment in the shipping world.

"They're building Ships out there!"



Building records on the Pacific Coast have been magnificent.

These achievements are only possible where the highest class equipment is used.

The value of Oxy-Acetylene and Davis-Bournonville Apparatus has never been so fully demonstrated as during these days of strenuous Government construction in the great shipbuilding program.

Here are some of the Pacific Coast users of Davis-Bournonville welding and cutting apparatus and mechanical devices:

Exclusive developments in mechanical cutting and welding with Oxy-Acetylene and Oxy-Hydrogen have been of invaluable assistance to metal workers, coupled with highest efficiency in results and lowest operating cost. The Radiagraph cuts from 1/2-inch to 20-inch steel plate, in straight lines or circles. The Oxygraph cuts in any direction, according to pattern or drawing, along straight lines, curves or sharp angles. Speed from 3 to 18 inches per minute, according to thickness.

"Davis Apparatus" has been continuously and effectively developed from the time the company brought the positive, independent pressure system of oxy-acetylene welding and cutting to the United States ten years ago, and is backed by the longest practical experience, greatest development, and widest application, providing portable hand welding and cutting outfits or the most complete installations with acetylene and oxygen and hydrogen producing and compressing plants.

Ames Shipbuilding & Dry Dock Co.
Bethlehem Shipbuilding Corporation—
Union Plant
Alameda Plant
Elliott Bay Shipbuilding Co.
Foundation Company—
Portland Yard
Tacoma Yard
Victoria Yard
Hanlon Drydock & Shipbuilding Co.
Moore Shipbuilding Co.
Todd Drydocks Corp.
Schaw-Batcher Co., Shipworks.
Seattle Construction & Drydock Co.
Skinner & Eddy Corporation.
G. M. Standifer Construction Corp.
U. S. Navy Yards—
Puget Sound
Mare Island

Davis-Bournonville Company

General Offices: Jersey City, N. J.

Factories at Jersey City, Elkhart, Ind., Niagara Falls, Ont.

OFFICES IN THESE CITIES WILL GLADLY FURNISH DETAILED INFORMATION

Jersey City
Boston
Washington, D. C.
Atlanta

Philadelphia
Pittsburgh
Cleveland
Cincinnati



Chicago
Detroit
Minneapolis
St. Louis

Seattle
San Francisco
Los Angeles
Niagara Falls

HEAVY BRONZE CASTINGS FOR MARINE WORK

The Acme Brass Foundry Company has built up during the past thirteen years a fine reputation for quality and prompt deliveries. Prior to the recent expansion in shipbuilding at the Port of Los Angeles, Fred K. Czerniski, the manager of the plant, supplied great quantities of brass and bronze castings for railroad work. The firm has recently



Furnace. Acme Brass Foundry Company

turned out one hundred and twenty bronze "bilge pump barrels" weighing 720 pounds each, and are now working on an order of 42 tail shaft sleeves weighing 3000 pounds each.

The Acme Brass Foundry Company takes great and justifiable pride in the fact that they always make deliveries on orders ahead of schedule time.

MARKEY MACHINERY CO.

Another thriving Seattle industry which is running to capacity, as the result of the immense shipbuilding program being carried on is the Markey Machinery Company, a rapidly expanding concern founded at Seattle some 12 years ago by Charles H. Markey, the head of the concern.

Mr. Markey started business in Seattle in a small way, whereas today he possesses one of the largest and best equipped machine shops in Seattle's industrial district. The plant is located at 85 Horton Street, on a tract of land at tidewater leased from the Port of Seattle.

The accompanying illustration gives an excellent interior view of this plant. Among the features may be mentioned the entirely new and modern machinery for handling all kinds of manufacturing in this particular

line. The system of handling materials is another demonstration of the thorough up-to-date arrangement of this plant, the highest state of perfection existing throughout. Fine large new lathes of the latest approved design have been installed for the finishing of propeller shafts and other large machinery parts, a business of which this plant makes a specialty. It has been the effort of this company to keep thoroughly equipped with devices for the ready handling of all modern marine mechanical equipment.

Screw Propellers for Hydraulic and Aerial Propulsion. By Rear Admiral Charles W. Dyson, U. S. Navy. Two vols., Text and Plates. 325 pages; numerous diagrams and tables. John Wiley & Sons, New York.

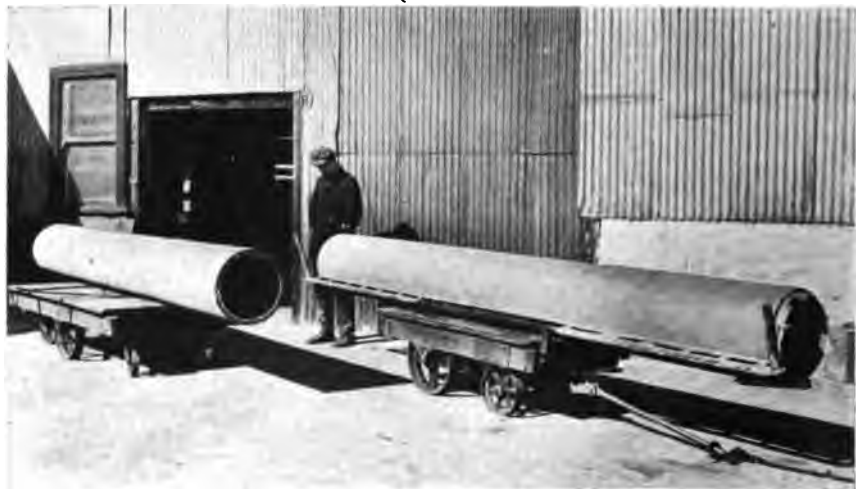
Dyson on Propellers has come to be standard practice with marine engineers to such an extent that the editor can do no more than welcome this new and enlarged edition. Quoting the preface we find, "The author's ideas concerning the phenomenon of cavitation having become crystallized during the later years through more thorough investigation, they are now presented in the chapter devoted to that subject. A chapter dealing with the design of the aeroplane propeller has also been added, but this cannot be regarded as of nearly the same accuracy as that part of the work devoted to hydraulic propellers, as act-

ual measurements of powers, revolutions and thrusts occurring in actual flight are missing, and until such data are available design curves and factors of absolute accuracy cannot be attained. The author having carried his work on propellers as far as he feels able, will now lay it down, trusting that it will be picked up by younger and more energetic hands, who, loving the subject to the same extent, will carry the work along until 'the last word on propellers' has been said."

Rear Admiral Dyson has contributed more than any other one man to our knowledge of the screw propeller and problems of water propulsion, and this book is a fine monument to his life work.

Sea Plane Float Construction. By Charles G. McGregor of the Curtis Aeroplane and Motor Corporation. 15 pages; 32 diagrams. L. W. Ferdinand & Co., 152 Kneeland street, Boston, Mass. Free on request.

In reprinting this booklet from the pages of Aviation and Aeronautical Engineering, the publishers have added a very valuable contribution to trade literature. The text is clear and concise, and covers all the major details of seaplane float construction and design. Anyone interested in hydroplane engineering would derive much profit from a study of this book.



Bronze tail shaft sleeves. Acme Brass Foundry Company

MOORE'S

LAUNCHING GREASE

SAFEST AND MOST RELIABLE

LUBRICANT EVER CONSTRUCTED

USED & ENDORSED BY MANY SHIP BUILDING CO'S.

THE MOORE OIL CO., CINCINNATI, O.

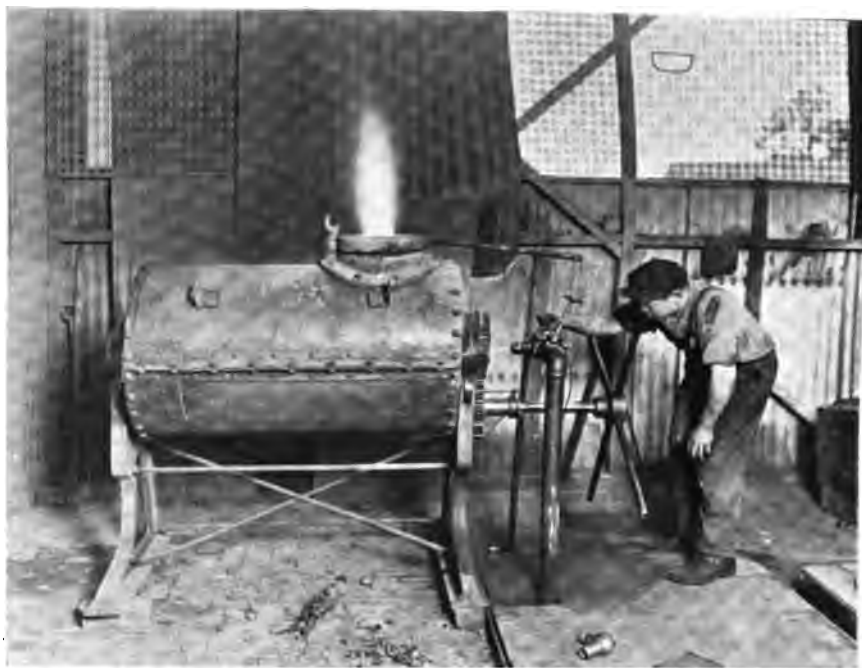
ESTABLISHED 35 YEARS

BRASS HARDWARE FOUNDRY

Price-Corcoran-Pfister Company of Los Angeles are manufacturing a general line of brass hardware on an extensive scale. They have a very modern plant equipped with a mono-rail system for handling material and finished products between the various shops.

The foundry uses air vibrators and sprays, electric riddles and pneumatic rammers. A fine plating plant is in operation and a well-equipped machine shop for finishing.

This firm has developed a very economical blast furnace for small heats. Our illustration shows one of these designed for a capacity of 600 pounds of brass. Oil is used for fuel and the economy is so marked that the Price-Corcoran-Pfister Company has received orders for a number of these furnaces from other brass foundries.



Blast furnace used by Price-Corcoran-Pfister Company, Los Angeles

Marine Auxiliaries is the title of the latest catalog issued by the Griscom-Russell Company, of 90 West street, New York. The evaporator, distiller, evaporator feed heater, feed water heater, oil cooler, oil heater, grease extractor and aerating filter are all described and illustrated in a manner at once instructive and attractive. The catalog is a splendid example of the catalog makers' art and will be found of great interest to all marine engineers.

Mr. B. H. Tripp, special representative of the Chicago Pneumatic Tool Company on the Pacific Coast, has succeeded Mr. M. W. Priseler as district manager of sales for the Pacific Coast territory. His headquar-

ters are at 627 Howard street, San Francisco. The Los Angeles branch of the company at 521 Title Insurance Bldg. comes under Mr. Tripp's jurisdiction.

Additional Puget Sound Notes

WHAT is believed to be the largest deal ever made in wooden ocean-going ships on the Pacific Coast has been completed by the Seattle shipping firm of Thorn-dyke & Trenholme. It includes the purchase for French interests of six wooden motorships, the entire present output of the Lyall Shipbuilding Company at Vancouver, B. C., at a consideration of about three million dollars. The big transaction was the immediate result of the conclusion of peace, and is taken by shipping men as an indication that wooden shipyards of the Pacific Coast, and particularly of the State of Washington, will have work for several years to come in supplying the demand of European countries for wooden bottoms. Within the last few days Thorndyke & Trenholme have received letters from French, Italian and Belgium interests stating that they would be in the market for all available wooden cargo steamers on the close of hostilities.

The launching of the steamship Western Knight by the Ames Shipbuilding & Drydock Company on November 9 marked the putting of the first of the new type of Ames design 8800-ton steel hulls in the water. The vessel is of a different type than the other 8800 tonners constructed by this as well as other Seattle steel plants, and, as the picture shows, the lines are more refined, she being constructed along the cruiser type, having a sharper prow and a slightly greater draft. Mrs. H. J. Rahlves, wife of the general superintendent of the shipyard, acted as sponsor. The Ames plant is building this type of ship exclusively.

During the period when several disastrous wrecks were reported in Alaskan and British Columbia waters, the local harbor became the scene of a collision which, fortunately, took no toll of life. On the morning of October 30, during a dense fog, the Osaka Shosen Kaisha liner "Mexico Maru" rammed and sank the Northwestern Fisheries Company's sailing ship "A. J. Fuller," which was moored to a harbor buoy. All hope of salvaging her has practically been abandoned. In sinking, the "Fuller" carried down the new harbor buoy valued by the city at \$20,000.

INSTALLING ENGINEER

is open for engagement on Pacific Coast. Experience covers two years in coast yards, three years in sea service. Technical school education, excellent references: Pacific Coast shipyard officials and Emergency Fleet Corporation officers. Member of N. A. Stationary Engineers.

CARL PIPER,
905 Willamette Blvd., Portland, Oregon.

FOR SALE

Triple expansion Marine Engine 18"x32"x54" 42" stroke, complete with jet condenser. Has been in service fifteen lake seasons in a wooden steamer of 3000 tons capacity. Has been thoroughly overhauled and is in A-1 condition. Shipping weight approximately 70 tons. Windlass, 8x10 of Providence manufacture, suitable for 1-3/4" stud link chain. Arranged for capstan drive. In first class condition. Both subject to inspection. Immediate delivery.

MCDUGALL-DULUTH COMPANY, Duluth, Minn.

CENTRIFUGAL PURIFICATION OF LUBRICATING OIL

THERE has recently been perfected by the De Laval Separator Company a machine for oil reclamation especially designed for the saving of oil in steam-driven marine power plants.

In such plants, the bearings, and in the case of turbine-driven units the reduction gears, are lubricated with large quantities of oil flowing over the moving parts. Some of these bearings and parts are cooled by water circulation; others are cooled by oil circulation, and this oil is subsequently cooled in a separate oil cooler in which water cir-

operator will notice the presence of water in the system by watching the discharge. In addition, a De Laval Purifier is much preferable to filters or any other method, as it will handle a much larger quantity of oil, is positive in action and is not affected by the motion of the ship. It occupies less than two square feet of floor space.

The absence of dust, grit and other foreign particles makes the wearing parts last longer and reduces loss of power. The De Laval method makes the used oil as good as new, eliminates the dangers of a clogged oil system and helps maintain the factor of safety originally calculated by the designers. It is now in use on vessels of various kinds.

Construction and Operation

As already stated, the machine occupies less than two square feet of floor space. It consists essentially of a cast-iron frame provided with suitable bearings for supporting a verti-

style, 750 pounds net; turbine-driven style, 650 pounds net.

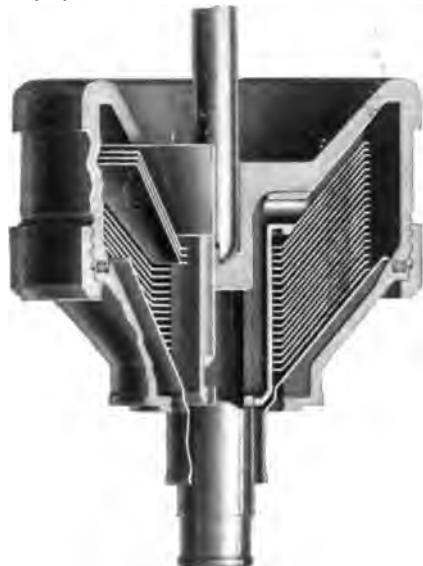
The Purifier is also made in smaller size, either steam or motor-driven. Capacity of the smaller size is 100 gallons per hour. The weight of the motor-driven purifier is 390 pounds net, and the steam-driven purifier, 290 pounds net.

The arrangement of the rotating parts is clearly shown in Figure 2. The worm screw is multiple threaded, having eight threads, and the proportions are such that the speed ratio between the spindle and the worm wheel is about ten to one. That is, with a speed of 700 revolutions of the belt pulley, the bowl will make 7000 revolutions per minute.

Operation of Bowl

When the bowl is revolving at the proper speed, the oil to be purified enters the central tubular feed shaft and then passes downward and out through slots into the channels in the distributor, then through the holes in the bottom of the distributor to the disc separating space in the bowl. Here, due to centrifugal action, separation takes place. The material, which is heavier than the water, such as sand, metallic particles, etc., is thrown outward to the periphery of the bowl and held there in the sediment pocket by centrifugal force. The water being heavier than the oil also passes outward and upward along the outer edge of the discs to the discharge outlet.

The oil being lighter passes inward between the discs toward the central shaft, thence upward to the discharge outlet. Surrounding the outlets are the liquid cover and the sludge cover, so arranged that centrifugal force throws the liquids from the outlet openings into the covers, whence it is conducted to the proper receptacles by the attached spouts. In addition to the above two covers, which would normally take care of all requirements, a third cover, known as the overflow cover, is provided. If at any time the bowl should become clogged by a large amount of dirt, so that the liquid can no longer flow through, the inlet tube fills up and overflows. In the construction with only two covers, this would result in a contamination of the oil already purified, but by using a third cover the overflow is kept separate and acts as a warning signal that the bowl needs cleaning.



Sectional view, oil purifier bowl

culation carries off the surplus heat of the oil. In either case, it is inevitable that some of the water will find its way into the oil system, due to leaks developing in the oil coolers as well as in the pipe connections. In water-cooled bearings, some water will work in from the water to the oil side of the system. Another source of water in oil is the sweating of oil storage tanks. The presence of water, especially of salt water, in machinery, has always been the cause of much trouble because of the rusting of the parts. The admission of water to bearings and other moving surfaces causes uneven lubrication, resulting in uneven and excessive wear.

The De Laval method will remove not only all the water from the oil but also small particles of metal, dust and grit which come from the wearing surfaces and in various other ways are introduced into the oiling system, such as core and particles, pipe scale, etc., which are particularly in evidence in new installations.

For this purpose a De Laval Oil Purifier is installed between the overhead supply tanks and the drain tank so that oil can be passed from the overhead tank through the purifier to the drain tank. The purifier is placed so that it can be used to purify all or a portion of the oil. It is so piped up that the operator may clearly see the action of the purifier. As the water and the oil are entirely separated, no matter how much or how little of each is present, the



View steam-driven oil purifier

cal spindle which carries the purifying bowl at the upper end. The weight of the bowl and spindle, together with any thrust due to driving, is taken by two tread wheels, on which the polished end of the spindle rests. The bowl spindle is held in an upright position by a flexible spring-collar surrounding the upper bearing. The spring-collar permits a small amount of lateral motion and allows the rapidly revolving bowl to assume an unrestrained position. Surmounting the bowl are three covers arranged to serve for overflow, oil and water discharge, respectively. At the top of the overflow cover is the regulating cover into which the oil to be purified flows. The regulating cover is provided with a removable strainer to remove the large particles of foreign matter from the oil before it reaches the bowl. The purifier is either motor-driven or steam-driven. The general capacity and weight of these two types are as follows:

De Laval Oil Purifier, steam or motor-driven. Capacity 300-350 gallons per hour. Weight, motor-driven



View motor-driven oil purifier

A COMPACT REFRIGERATING UNIT

Recent orders from the Emergency Fleet Corporation and prominent shipbuilding concerns for the refrigerating machine unit, shown on this page, indicate the advantages of this machine are meeting with the approval of shipbuilding refrigerator experts.

The advantages of this type are obvious, as the assembly of the engine, compressor, trap, condenser, cooler, circulating pump, liquid receiver, etc., together with the necessary controlling valves, gauges, relief valves and piping area, on a single cast-iron base, economizes time and labor.

This method of construction not only conserves space but eliminates much of the usual skilled labor required for the installation on shipboard. This feature is of especial interest to shipbuilders who prefer to make their own installation, although the Refrigeration Engineering Company will contract for the complete installation if desired.



The unit complete

Several mechanical features are incorporated in the design of this machine. The compressor is a two-cylinder with valves of large area, a breaker valve located in the piston head relieving the vacuum, insuring cool cylinder walls. The condenser and cooler are both counter current submerged coil type, with areas greatly in excess of capacity required. The positive acting rotary circulating pump is operated by a silent chain driven direct from the main shaft.

The engine is provided with a positive sight feed oiling system for all bearings and is of unusually slow speed for machines of this small size, being operated at 140 to 180 r. p. m.

A most interesting feature of this machine is the fact that the assembly of all apparatus, etc., on a single base permits the complete outfit to be erected at the factory and subjected to an exhaustive refrigeration test under actual operating conditions before shipment.

A new type scuttle butt of exclusive design is used. It is provided with cast-iron heads and the hand hole is so located that the scuttle may be easily flushed and cleaned.

The Refrigeration Engineering Co. of Toledo, Ohio, are making this machine in one and two ton sizes only, and as they recently arranged to de-

vote their entire factory capacity to the production of these two sizes exclusively, they are in a position to accept additional contracts and guarantee delivery dates.

Complete details, drawings, etc., may be secured by firms interested by writing the company at Toledo, Ohio.

"READY FOR THE IRONS"

If it had been possible five years ago to announce to the shipbuilding world that an invention had been perfected that would turn out spars and booms by machinery and that such an invention was capable of doing with three men the same amount of work that under our old method required at least twenty-five men, we may all take it as an accepted fact that such an announcement would have created a sensation and widespread interest in the marine fields.

For the past two years we have been too busy watching results, and have overlooked in many instances the extreme importance of that which has made these splendid results possible. The observer of today, however, especially if he were an old-time ship outfitter, would feel well repaid if fortunate enough to be permitted to visit the plant of the Western Spar Company of Portland, Ore. There he would see a mere corporal's guard of men engaged in the task of turning out dozens of spars and masts and booms and rapidly assembling them for shipment by rail and water to all parts of the United States. But the large number of these immense sticks is only part of the impressive sight, for each stick is knotless, checkless and blemishless and has been turned with the accuracy of a piece of furniture. Some of the larger spears measure 130 ft. in length, 25 ins. at base, accurately tapered to any tips required, and the assortment includes many of less length, also a large number of booms varying from 10 to 80 feet in length.

The plant of the Western Spar Company is located on the Columbia River near Portland, with facilities for transportation by rail or water. The logs used by them are the selected timbers of this greatest of all timber districts and the set up of the machine is such that it is impossible for the logs to be centered other than accurately. As soon as the stick is off the machine it is turned over to the painting crew and given a good coating of oil or shellac. One glance at this accurately tapered timber is enough to convince the most skeptical of the superiority of the machine-made masts and spars.

The turning out of these sticks of timber with perfect accuracy by machinery is a complete innovation, it having been the custom for years to work them out altogether with hand power. The immense saving in labor and time may be realized when we consider that under the old hand-work method the turning of a dozen large spars would require approximately twenty-four men working 30 days each, whereas the machinery of the Western Spar Company can turn out a dozen 130-foot sticks with three men in a smaller number of hours. It seems preposterous that in these days of all our modern machinery we have only recently gotten away from the old idea—and it is equally preposterous if at the same time when the need of men and ships is so urgent, any shipbuilder in the United States or Canada is still hewing out his masts and booms in the old, antiquated way.

And, having turned out a superior product, the Western Spar Company goes even farther than that—it guarantees to deliver this product in perfect condition. The shipbuilder on the Atlantic seaboard or the Great Lakes need not fear to place his order with this Pacific Coast organization. Each stick is packed for shipment with the utmost care. A cushioned cradle for each stick protects it from the bruises and wear of a



Spars ready for shipment. Western Spar Company, Portland, Oregon

long rail trip and for a transcontinental trip a housing is built over each car to protect the shipment from dirt, cinders and the weather.

"Ready for the Irons" is the slogan of the Western Spar Company, but it is more than a slogan with them—it is an actual accomplishment. Shipbuilders on the Atlantic, the Pacific and the Great Lakes have all made use of these machine-made "Ready for the Irons" masts, spars and booms, and the repeated orders received from them show that these builders have seen and appreciated the enormous labor-saving accomplished for them by the Western Spar Company. Instead of the slow and laborious hand-hewn method, it is now necessary only that a blue print or specifications, if ordering a standard government size, be mailed to the Western Spar Company, 910 Yeon Building, Portland, Oregon. The shipment covering your requirements will promptly be sent out and to those who have not heretofore used the services of this company the result will be a most pleasing business surprise.

C. M. GAY & SON

This old and very responsible concern, under the direct management of Norman H. Gay, has long been located at 335 Towne avenue, Los Angeles, and enjoys the confidence of all with whom they have had business relations.

C. M. Gay & Son are refrigerating engineers and contractors of wide note, and distributors for the Vilter line of ice-making and refrigerating machinery, the Armstrong Cork & Insulation Company, and the Stevenson Cold Storage Door Company, and carry the most complete line west of Chicago of all materials required for cold storage and ice making plants.

The demand at this time for the proper handling of perishable foods in California requires additional mechanical refrigerating machinery, and C. M. Gay & Son are making extensive improvements at Vernon in order to more promptly meet the requirements of their trade.

The property has a frontage on Santa Fe avenue of 120 feet and a frontage of nearly 500 feet on 27th street. The main building facing Santa Fe avenue is a two-story brick construction with ornamental tapestry brick front.

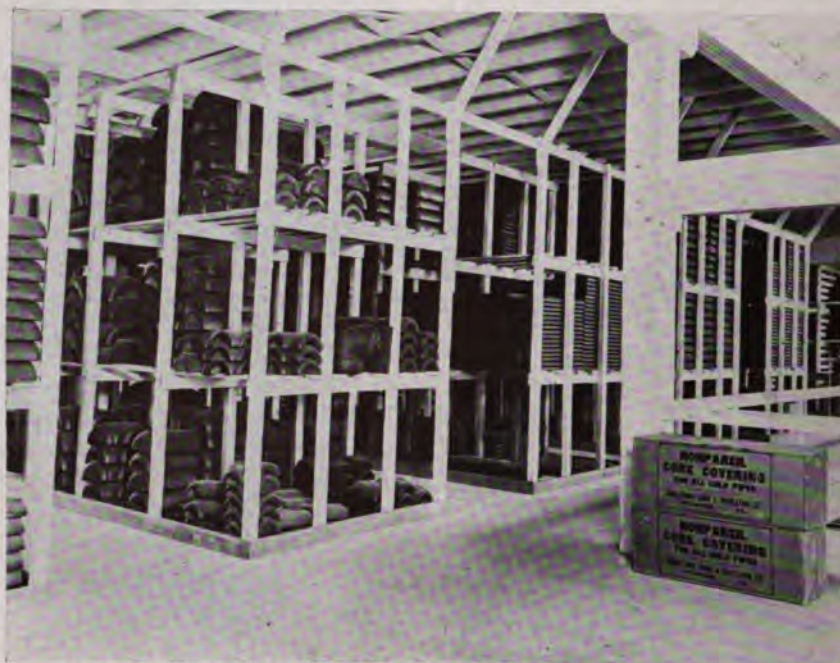
The front part of the building will be occupied by offices and retail supply room.

The back portion of the building, with entrance on 27th street, will be used for manufacturing refrigerating specialties.

The other buildings facing on 27th

street will be used for manufacturing refrigerators and housing several different kinds of manufactured cork products for cold-storage insulation.

A large portion of the foregoing materials are being used in the construction of ships by the many concerns now engaged in that industry in this district.



Store rooms of C. M. Gay & Son, showing small part of stock of cork coverings

COMPRESSED AIR EQUIPMENT

The National Compressed Air Machinery Company of Los Angeles, specialists in compressed air machinery and accessories, as the name implies, are building a line of vertical single-acting crosshead type air compressors, and double-acting vertical vacuum pumps, both of which possess merit in design and construction worthy of the attention of users of this class of machinery.

The double cylinder 10x10 compressor shown is designed for a maximum pressure of 110 lbs. and has a displacement of 320 cubic feet of free air per minute, and this same type of machine is designed for other capacities and pressures ranging from 42 cubic feet to 2000 cubic feet per minute.

Some of the novel features are: Its massive construction; removable type of bearings; step piston in combination with cross head; unique system of lubrication and light, silent, efficient valves, all of which are the outcome of years of thought, study and experience of their manager, Mr. F. A. Hatfield, and are fully covered by patents.

The piston is of the ice machine type, having the inlet valves in the head. Protruding down from the rings, which are near the top, is an apron, the function of which is to dip into a reservoir of oil located at the bottom of the stroke and distribute a thin film oil evenly over the walls of the cylinder as the return stroke

is completed.

The bearings, three in number, are interchangeable and of such construction that they can be removed for re-



8x10 double-acting vacuum pump of the National Compressed Air Machinery Co. On the testing floor



Apex Manufacturing Co.

EMERYVILLE, OAKLAND, CALIF.

METALLIC LIFE BOATS AND RAFTS

CROWS NESTS—COWLS—TANKS—LOCKERS, ETC.




**STANDARDIZED
Marine Paints**

Outside White
—made expressly for exterior marine uses and is especially adapted to withstand the action of salt air. This paint is particularly desirable because it retains its color and has unusual durability.

Hull Black
—extensively used because of its exceptional covering capacity, ease of application, toughness and deep black color.

Standard Navy Mast Color (Buff)
—the approved paint for masts, booms, hatch-coamings, and similar uses. Made of special ingredients to assure that, after long wear, its famous color—the standard buff—will be retained.

Bottom Paints
—made according to thoroughly proven formulas. Our copper, anti-corrosive, anti-fouling, and boot-topping paints give the maximum service under the most severe conditions.

PABCO MARINE PRODUCTS
include a complete line of Marine Paints, Bituminous Enamels, Calking Pitches and Seam-Tite (a packing for seams).

Samples, prices and complete information, gladly sent. Write or wire.

THE PARAFFINE COMPANIES, INC.
34 First St., San Francisco

PLEASE MENTION THE PACIFIC MARINE REVIEW WHEN YOU WRITE



Electric-driven 10" x 10" compressor. National Compressed Air Machinery Company

babbitting and replaced without disconnecting or interfering with any other part of the machine. Laminated copper shims of .001 inch in thickness are used and the bearing

caps held to place by studs and Drake Lock Nuts.

The lubrication of the working parts below the piston is the splash system. The crosshead, which comes

below its guide on its downward stroke, receives a coat of oil which it carries by means of oil grooves to the top of the guides, where it is deposited in a reservoir at the bottom of the cylinder. It is then distributed over the cylinder walls by the piston apron as described above. The amount of oil thus utilized is practically negative as compared with other systems.

The valves are of the disc type, light in construction, and their peculiar reinforced seats are conducive of long life. A guide prevents the valve from cocking, replaces it again to its exact seat, which is self-cleaning, and forms a cushioned stop, yet always permitting of ample valve area.

The popularity of these compressors is attested to by the large number of installations for the operating of pneumatic tools in the various manufacturing plants, and drills in mines; also for gas boosting for shipyard purposes, and various other fields where air is required.

A 10x8 double-acting vacuum pump built by this company for the Standard Vacuum Machine Company of Detroit, Mich., is in operation at Saginaw, Mich. Before acceptance this machine was given a continuous run of twenty-four hours. Indicator cards were taken at intervals by their engineer, Mr. Gearing, of Los Angeles, and the vacuum and temperature recorded. The cut shows pressure and vacuum gauges and indicator in position. The phenomenal vacuum of 29¾ inches was maintained through the entire run. While the guarantee was for 28 inches, the machine has been steadily operating for the last eight months, pulling a 29-inch vacuum. This machine has a displacement of 580 cubic feet per minute. Other sizes range from 60 to 2000 cubic feet displacement. Since delivery of the above machine, Mr. Gearing has ordered three more of the same size; also a smaller machine of the same type for his laboratory.

The personnel of the National Compressed Air Machinery Company is: Benj. Schonfeld, president and treasurer; F. A. Hatfield, vice-president and manager; Wm. A. Chisholm, secretary.

WHITE BROTHERS

HARDWOOD

LUMBER
TIMBER
FLOORING
VENEERS
PANELS

INDIANA BENDING OAK-TEAK-ASH
WHITE CEDAR-IRON BARK-MAHOGANY
— — — LONG OAK KEELS — — —
EASTERN WHITE AND RED OAK, ETC.

FIFTH and BRANNAN STREETS
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THE LARGEST STOCK OF HARDWOODS IN THE WEST

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Gauges with needle at 29 3/4" vacuum

FULTON ENGINE WORKS

The Fulton Engine Works has been a part of the industrial life of Los Angeles for thirty years—starting as a small jobbing machine shop in early boom days, extending and enlarging from time to time as the section developed and its business increased. It was incorporated in 1891 and is still owned and operated by the original incorporators.

The business of the concern has been general jobbing and contracting for all sorts of engineering equipment, as well as designing, constructing and installing light and heavy machinery. Throughout its business career it has been called upon to supply all kinds of hoists and has established special lines of hoisting equipment for almost every service and ranging in size from three to three hundred horsepower. Hoists for docking baskets of fish from a fisherman's rowboat; hoists for drawing a thousand-ton vessel out onto shipways; hoists for windlassing a bucket of precious ore from some underground seam, and for raising great cages and skips at lightning speed through deep mining shafts; hoists for scraping earth into ditches, and hoists for excavating great pits in granite boulders, taking out a half carload at a trip, have been and are being produced at this plant.

So hoisting machinery became a line in which the Fulton specialized, and for which they improved and enlarged their equipment as demanded.



Six horizontal winches on floor. Fulton Engine Works

Today the shop is as well fitted up for the line as any plant in the West and their designs of all lines of hoisting machinery, using hand, steam, gasoline or electricity for power, cannot be equalled.

The shops occupy three acres of ground in the northern industrial district of Los Angeles. Railroad tracks in the yards serve the plant, which consists of a complete pattern shop,

foundry, bronze casting shop, boiler shop, forge, machine shop, erecting shop and store rooms, all fitted up with modern and first-class equipment. Offices and engineering departments are commodious and well arranged. The crane equipment is adequate in all departments.

The size of the plant can be judged from a statement of machine tools in the machine department, comprising 20 lathes from 14 to 54-inch swing, 4 planers from 30 inches to 5 feet open side, 10 drill presses from the smallest to 6 feet radials, 3 vertical boring mills from 37 inches to 12 feet, a hobbing gear cutter with capacity up to 8 feet in diameter, 4 milling machines, 5 turret lathes and screw machines, horizontal mills, grinders, hydraulic press and complete air, gas, electric and small tool equipment for the whole.

Naturally a shop of this character would seek contracts for winches, capstans, windlasses and deck equipment for the great fleet of vessels now under construction for the Government. The plant is working to capacity on this line of equipment for the Bethlehem Shipbuilding Corporation.

The illustrations show—



Carload of winches ready for shipment. Fulton Engine Works

Erecting six double-g geared horizontal winches.

A carload of vertical winches ready for shipment, surrounded by numerous castings for hoists under construction.

Owing to the capacity and equipment of this plant, not a minute has been lost to the purchasers of its product waiting for deliveries. Two hundred and twenty-five men are now employed.

The officers of the company are: W. Lewis Bell, president; Alex. J. McCone, vice-president; F. A. McAllister, secretary and manager.

The company maintains an office at 510 New Call Building, San Francisco, California.

THE PIONEER LOS ANGELES BRASS FOUNDRY

James Jones started in the brass foundry business in St. Louis, Mo., in 1877. Hearing, like so many others, the "call of the West," he came to Los Angeles in 1892 and established the James Jones Brass Works. Walter Jones, vice-president, and Wallace B. Jones, secretary, are now the active members of the firm and their team work is largely responsible for the phenomenal growth of the foundry's business in the last ten months, which has necessitated an annex with three brass furnaces.

The firm has recently added Thos. Bartlett to their staff of experts. This gentleman is well known to the

shipping trade and has made a special study of the peculiar requirements of ship fittings.



View in James Jones Brass Foundry

The James Jones Foundry are making a specialty of brass goods to meet U. S. Navy standard specifications, which is one secret of their success. They also furnish large quantities of castings to the Municipal Water & Gas Works and have made a great reputation for prompt deliveries.

GREAT GROWTH OF A LOS ANGELES MACHINE TOOL MANUFACTURER

Back in the early nineties G. A. and C. F. Axelson, two young men of Swedish parentage, felt the lure of the great Southwest and, going to Los Angeles, established there in 1896 the Axelson Machine Company. This beginning was in a very modest way, and the plant occupied about 2000 square feet of floor space and gave intermittent employment to 20 men. From this small institution has emerged, through natural growth of market for their products and the confidence engendered by fair business dealings, a modern manufacturing establishment at Randolph street and Boyle avenue, covering seven acres and employing steadily several hundred men.

In planning the buildings that house the present plant, the Axelson Machine Company has spared no expense in their efforts properly to safeguard the health and general well-being of their employees. Abundance of light and ventilation have been provided, together with every convenience for absolute cleanliness and perfect sanitation.

The foundry, equipped with the most modern mechanical devices for ramming, tamping, blowing, cleaning,



Office of Axelson Machine Company

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"The Standard of the Pacific"

(Made on the Pacific Coast)



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Twin Strainers

Oil Heaters and Oil Coolers
Evaporators and Distillers
Vertical Marine Pumps

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Pattern Shop—Foundry—Copper Coil Shop—Plate Shop—Machine Shop

THESE ARE ACME BRONZE CASTINGS

Here are eleven Bronze Bilge Pump Barrels weighing 720 pounds each. These are part of an order of 120 Pump Barrels totaling 86,400 pounds.

Each one of these castings was delivered on or before the specified dates.

May we serve you?



ACME BRASS FOUNDRY CO., Inc.

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etc., has a capacity for fifty tons of metal per day, and is housed in a building 100 feet wide by 160 feet long, the roof of which is generously



Stock room. Axelson Machine Company

provided with ventilating skylights. The machine shop building is an excellent example of the modern saw-tooth truss roof and is flooded with light in every corner. Here is

installed a very fine collection of all the most up-to-date machinery used in the manufacture of the best 16-inch, 18-inch, 24-inch engine lathes that good material and excellent workmanship can produce.

A pattern shop equipment especially adapted to lathe manufacture is housed in a building 27 feet by 80 feet, with a pattern store room of



Machine Shop. Alexson Machine Company

fire-proof construction adjacent to the shop, and of the same size as the latter.

A forge shop, equipped for light forging and tool dressing, occupies a building 27 feet by 80 feet, and garage accommodation is provided in a fire-proof structure for the convenience of employees.

A thoroughly competent engineering and accounting force is housed in a modern office building, equipped with all the machinery of systematic efficiency. Throughout the plant the Axelson Machine Company's motto,

"Accuracy, Rigidity, and Quality" is impressed on every manufacturing and engineering detail.

POPULAR SOUTHERN SHIP CHANDLERS

The Marine Hardware Company of San Pedro have achieved a very enviable record for promptness and courtesy in filling the many orders for ship hardware that have been given them since the present boom in shipbuilding started.

The business of the firm has grown tremendously and they are now handling a large line of heavy ship supplies, as well as shelf hardware, oils, paints, etc.

As agents for Plymouth Cordage they have supplied a large part of all the ropes and hawsers used on ships built around the harbor of Los Angeles, and the manager, Ray Mitchell, has become "The Popular Supply Man of Pedro."



The Marine Hardware Company, San Pedro



Foundry. Axelson Machine Company



JAMES JONES CO. BRASS WORKS

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Los Angeles, California

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SHIPBUILDING COMPANY

WOODEN VESSELS

BUILDERS OF
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Seattle's First Ferris Type Ship

SIX BUILDING WAYS

For Vessels up to 5000 Tons

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NOW IS THE TIME TO BUY WISELY

Purchase machine tools and equipment best suited for the job. Don't take the first tool offered to you; submit your problems to us and get facts and data about the latest labor-saving machinery for

**MACHINE SHOPS
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The shops and marine railways of the Marine Equipment Company

"SOUTHERN CALIFORNIA BOAT BUILDERS"

The "Marine Equipment Company, Boat Builders," of Wilmington, possess one of the most complete boat building, small ship repair, and marine supply plants in Southern California.

They have built and equipped a very successful fire tug for Los Angeles harbor, and are making a specialty of repairing and supplying the large fleet of power fishing boats which operates out of San Pedro. Three electric marine railways are installed and a large warehouse in which is kept a complete stock of supplies and of the Kahlberg Heavy Oil Marine Engines, for which this firm is agent.

A SOUTHERN STEEL FOUNDRY

Steel castings have to a very large extent taken the place of forgings in marine work, and Los Angeles is

to be congratulated on possessing in the plant of the Warman Steel Castings Company a modern steel foundry of large capacity.

As our illustrations show, the electric steel-making process is used. Two large furnaces are installed, each with a capacity for pouring 6500 lbs. to a heat. These are used alternately, the basic lining having to be renewed about once a month. The total capacity of the plant is approximately 400,000 lbs. of finished castings per month.

Heat is applied to the furnace by means of three huge electrodes, each

carrying 5000 amperes at 100 volts. Power is taken from a 15,000-volt high-tension line running adjacent to the works. A five-ton Baker electric bridge crane is part of the shop equipment, and a large annealing furnace.

G. B. Warman, superintendent of the steel plant, is the practical foundry man; C. J. Wilde, secretary and manager, is well known in metal-trade circles of the Pacific Coast; and A. W. Elkington, president of this great steel plant, is noted for his executive ability.



Foundry of the Warman Steel Castings Company



Electric furnace. Warman Steel Castings Company

ICE MACHINES

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We offer our experience of many years
as specialists in Marine Refrigeration.

A PROGRESSIVE MACHINE AND SUPPLY HOUSE

In their business experience in Los Angeles, covering a period of three and one-half years, the Herbert's Machinery & Supply Company have five times found it necessary to move to larger quarters. Mr. Curtis A. Herbert has always made a special study of the requirements of each pros-



Show room, Herbert's Machinery and Supply Company

pective customer, with the result that he has a large number of satisfied buyers. The firm carries \$50,000 worth of machine tools in stock and handles wood-working machines, pipe and bolt machines, grinding machines and drills, shapers and lathes, belting and other supplies.

THE LARGEST MALLEABLE IRON FOUNDRY ON THE PACIFIC COAST

Such is the claim of Jas. C. Long, W. A. Robertson and E. M. Fuller, the personnel of the Western Malleable Castings Company of Los Angeles.



Reverberatory oil fuel furnace, Western Malleable Castings Company

The plant of this company is modern in every way, possessing the only oil fuel reverberatory furnace on the Pacific Coast, and they are prepared to supply malleable iron castings made to specified tensile or transverse strength tests, true to pat-



Sample of Castings, Western Malleable Castings Company

tern and free from all blemish, crack or scale, up to any size and in any quantity.

Bolinder's Fuel Oil Engines is the title of the latest bulletin issued by Henry Lund & Co. This handsome publication will be found of great interest and value to any ship owner or engineer interested in the marine uses of fuel oil engines. The subject matter is made up of carefully collected and authentic data relative to the performances of the many craft on the Pacific Coast now operating with Bolinder engines. The different vessels powered with Bolinders are described fully and histories of their performances on long and short voyages at sea have been extracted from the engineers' and deck officers' logs, and entire bulletin forming a valuable reference work in regard to the development of the use of Bolinder engines on the Pacific Coast. This development dates from the fitting out of the bay tug "Marie L. Hanlon" with a 160 horsepower engine in 1913, and the results obtained in five years speaks volumes for the thorough pioneering and sound business policy of Henry Lund & Co., which firm has controlled the destinies of the Bolinder engine on the Pacific Coast from the first.

Those interested should apply to Henry Lund & Co., Marine Building, San Francisco, for a copy of the latest Bolinder Bulletin.

THE HERCULES MACHINE IS MOST SUCCESSFUL

The American Pipe Bending Machine Company, manufacturers of the "Wonder" pipe, tubing and solid bar bending machines, Boston, have been the recipients of many congratulatory messages on the success of their new Hercules machine. The principal features of this machine are the short length of time required for making a 6-inch bend cold and the high quality of the work the machine turns out. As far as this Company can ascertain, a bend of this kind has never before been made cold. The average charges for making a 6-inch 90-degree pipe bend by pipe bending concerns is \$25.00 or more and several hours are required to do this work. The cost of making the same bend on the Hercules is not more than \$1.50 for labor, and the time required is less than ten minutes. On September 16, 1918, when a demonstration was made by the American Pipe Bending Machine Company of Boston, the bending of a six-inch iron pipe to a ninety-degree bend was done in nine and one-half minutes and the work was performed by six laborers handling the lever of the machine. The bend itself was as near perfect as could be made by any other process, either hot or cold bending.

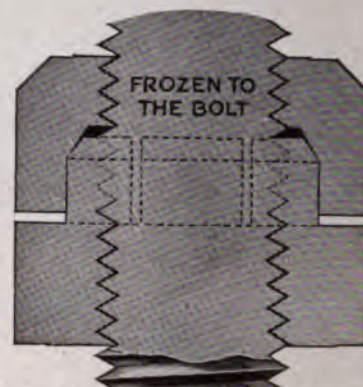
The Drake Lock Nut, which was originated by Mr. Geo. F. Drake, of San Francisco, is one of our California productions that is a valuable contribution to the industrial and mechanical world.

It is stated by Mr. Drake, the patentee, that it was his idea to at once develop a lock nut that would be a

secure lock on the bolt and at the same time a simple and correct mechanical job, manufacturable at a reasonable price.

The illustration herewith represents to scale a 1-inch U. S. S. Drake Lock Nut in place locked to the bolt. Mr. Drake claims that the lower or nut member has an ample wrench hold to turn up the nut and pull the work into place, giving it a micrometer adjustment, after which the upper or locking member is turned down and the contact occurring only on the 25-degree angle at the top of the boss, which is made flexible by slotting, the lower member is securely locked on the bolt at the point of adjustment first obtained without lifting the load off the lower member on to the upper member.

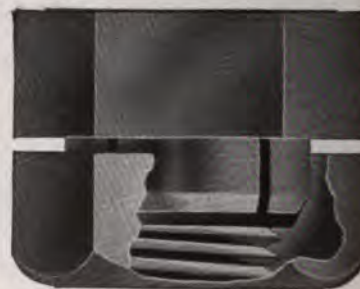
Mr. Drake states that this is explained by the fact that the two members never contact or seat on a horizontal line, but on the annular bevel at the top of the boss and the interior annular bevel in the upper



Sectional view of Drake Lock Nut set up on bolt

member, which is situated at the "center of the mass" and point of greatest strength of the upper member. This bevel being 25 degrees and 20 degrees in larger sizes, has a much greater element of shrink than of lift, thus locking the flexible finger members of the lower member on the bolt without lifting the load already hanging there.

The second illustration shows that the device makes a complete "finished job," for the corners of the hexagon can easily be matched up in locking. The total height of the Drake Lock Nut equals a standard nut and check nut, and they are made in 1/4 to 1-inch sizes S. A. E. 1/4 to 2-inch U. S. S.



Drake Lock Nut